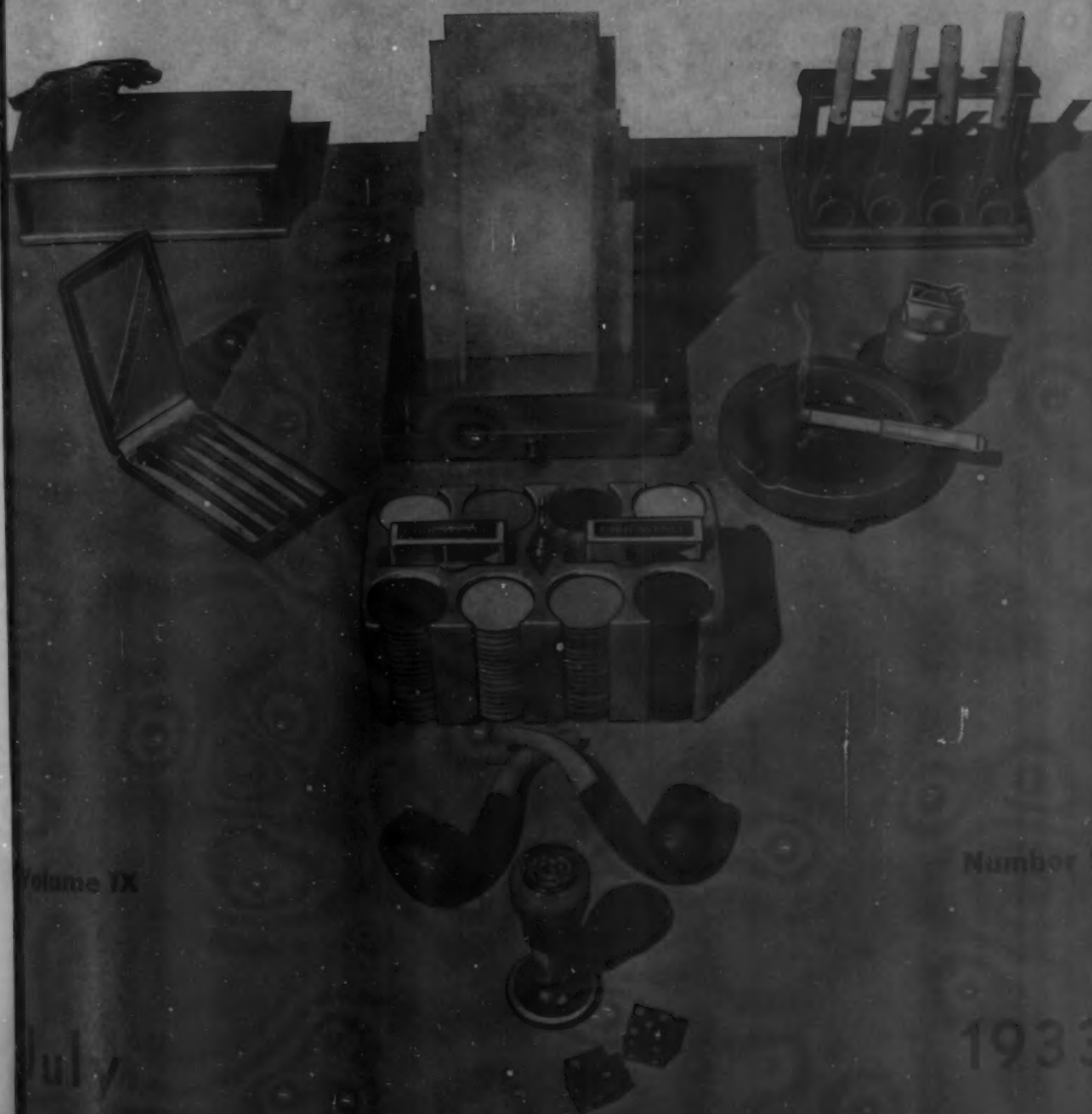


Plastic Products



Volume IX

Number 5

1933

July

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Volume IX Number 5

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Plastic Products

VOLUME IX



NUMBER 5

"Heaven Helps Those---"

WHATEVER of good or ill the Industry Recovery Law holds for American business, one plain fact stands out like a steeple. If the benefits of curtailed production and control of ruthless competition promised by this radical experiment are to be won by any industry, they must come through its own co-operative effort.

The Federal Administrator will not hinder any reasonable effort to correct bad trade practices; but he will not help save as a last resort. General Johnson, with remarkable good sense, is concentrating his efforts on the major objectives of spreading employment and raising wages. He has, however, indicated the ways and means by which any industry may take advantage of the opportunity the law creates. Unless an industry grasps this opportunity to organize and clean house, it will find itself with shorter hours to work, higher wages to pay, and without any compensating advantages. Parodying Mother Goose, Phillips of the Sun Dial has summed up this dilemma:

"General must I employ more men?"

"Yes, My word suffices;

Raise their wages, but don't produce
More goods or raise your prices!"

Nevertheless, the advantages to be gained are very real. Dr. Lewis Marks has pointed out that in every essential point the American trade association is now permitted to become a German cartel, authorized by law and permitted, so long as no monopolistic control is set up, to curtail production, to allocate sales, to curb price cutting. What is needed is a strong organization with an Administrator to see that the rules of uniform cost accounting and of fair trade practice are enforced. An industry that does not organize on this new and sound basis is apt to be haled to Washington by its labor or its customers and will find itself in the nasty position of buying from an organized group of raw material suppliers, hiring an organized working force, and selling to organized customers. To top all they may some fine day awake to find themselves under a Federal bureaucrat appointed as their administrator. These may be uncertain prospects, but they are certainly unpleasant.

The Plastics Group and The Recovery Bill

Raw Materials, Lacquers, Celluloid and Casein Fabricators Organizing Trade Groups---Molders to Meet at NEMA Headquarters July 13

LIKE most industries which were not already well organized with a single representative association or an industry-wide institute embracing smaller associations representing the different groups within the industry, the various plastics groups have been moving to organize trade associations under the Industry Recovery Act.

The Pyroxylin Association, through A. E. Pitcher (Pyralin), has taken the initiative among the producers of plastic raw materials, and held an informal meeting to discuss the practicability of bringing together the makers of phenolic, urea, casein, and acetate materials into a single organization and appointed a committee to formulate the plan and program.

Under the auspices of C. S. Lawrence (American Plastics) the fabricators of casein, recognizing the basic difference of their situation from that of the shell and bone-button manufacturers organization, have met and formed a temporary organization committee.

With Carpenter (Du Pont) and D. S. Hill (Celluloid) as leaders, similar steps have been taken among the fabricators of pyroxylin.

Sincere differences of opinion have developed among the molders as to the advisability of continuing their alliance with NEMA, or forming an association independent of the electrical manufacturing group, since it is estimated that only twenty per cent. of the molding business today goes into the electrical field.

On June 15, Douglas Woodruff (Auburn Button) Chairman, Molded Insulation Section of NEMA, circularized the entire molding industry, advising them that the NEMA organization was closely watching developments in Washington and that at an opportune moment action would be taken. He followed this on June 29 with another circular letter to all trade molders as follows:

To all Trade Molders:
Gentlemen:

Since our letter of June 13th, we have been in close contact with the developments arising from the National Industrial Recovery Act. No trade code has as yet been approved and it would appear that for some time to come little can be included in a code beside the maximum hours of labor and the minimum wage. Additions to the code covering price advances, resale price maintenance, prohibition for selling below cost, etc., will have to be made from time to time as rulings are published.

In our industry there has been a strong demand for some action toward a general meeting where all executives could be heard on their preferences for the type of organization best suited to comply with the law. Our present affiliation with N. E. M. A. seems to the members, based on their experience and knowledge of the organization, best suited for our needs, but being numerically a decided minority, wish in no wise to attempt to force the N. E. M. A. Section for the industry, if in the opinion of a general meeting, some other affiliation is deemed to be preferable. It daily becomes more obvious that our industry is too small to be given recognition by itself and there is also some question whether we would be allowed to affiliate with any other Association.

"Nema" Advantages

If we join with N. E. M. A. we would operate under their code with probably an addenda for any points that must be covered that are especially pertinent to our Section alone. It would cost each member under the present constitution, \$10.00 per month, and if we have a paid Secretary, possibly as high as \$20.00 per month. For this expenditure, we have the benefit of their years of experience, their legal talent, conference and Section meeting rooms and are relieved of the expenses and delay of organization, a Washington representative and other unknown expenses.

In order that we may at least start our organization under the new law, we are calling a general meeting of the industry for Thursday, July 13th, at 10 o'clock in the morning at the N.E.M.A. headquarters in the Commerce Building, at 155 East 44th Street, N. Y. C., and we hope for a representative meeting so that any action taken may be considered as authoritative for the industry.

On June 21, PLASTIC PRODUCTS, to help crystallize the opinion of the industry issued a statement to 76 molders of which the following is a summary:

What kind of a Plastic Molders' Organization do you favor?

The Industrial Administrator in Washington indicates plainly that:

1. His primary concern is to raise wages and spread employment.
2. The industries must themselves control competitive practices and appeal to him only as a last resort.
3. He will deal only with large industrial groups.
4. This group must contain at least two-thirds of the firms in the industry.

The present organization of molders is, as you know, a subdivision of the Nat'l Electrical Mfrs. Association. It has eight members: American Insulator, American Record, Auburn, Boonton, Bryant, Chicago Molded, Northern Industrial, and Norton. Shaw and Colt have recently resigned but their resignations have not yet been accepted.

The question is, will the interests of the 76 custom molders be best served by

1. Continued Alliance with the official association of one group of plastic customers.
2. An Independent Association of Molders
 - (a) Operated independently.
 - (b) Affiliated with the raw materials and other plastic fabricators.

The advocates of the NEMA affiliation point out that:

- A. It is a going organization.
- B. The expenses are known, fixed, and comparatively small.
- C. It furnishes secretarial, stenographic, legal and accounting services.
- D. The electrical industry has established contacts in Washington.

The advocates of an independent organization point out that:

- A. NEMA never had more than twenty per cent. of the molders as members.
- B. All expenses of an independent organization could be met by an assessment of one-half of one per cent. of the gross sales of two-thirds of the molders of the country.
- C. Truly efficient service and whole-hearted representation can only be obtained by the molders in their own organization.
- D. The molding industry is no part of the electrical industry

"One Big Plastics Union"

Alliance with the other plastic material groups is advocated on the grounds that:

- A. It would command the friendly support of the raw material producers.
- B. A centralized "Plastics Congress" could handle common plastic problems.
- C. All plastics are chemical synthetics, competitors with natural materials, and an alliance of this kind could develop co-operative propaganda.
- D. The various plastic materials, although very different in form and use, are sold in many instances to the same industries.
- E. Now is the time to set-up the ideal trade organization, and to make logical industrial alliances.

Our interest solely is to help. We are not seeking a job. We are not grinding the axe of any organization, group, firm or individual. We want your honest opinion in order to present the facts to the Committees that are working on this problem.

What 41 Molders Think

With this was sent a post-card asking for a vote on which type of organization was preferred, and whether or not they would attend a meeting to organize this type of association. The result of this was:

- Alliance with NEMA—8
- Independent Molders Association—11
- Alliance with Plastics Industry—17
- Any association with reservations—2
- No association—4
- Will attend meeting—27

With this poll came interesting comments, of which the following throw a real light on the various points of view expressed:

You have made a very fair presentation of the situation except that you have left loop holes for argument on the section devoted to the independent organization, which I might cover as you have numbered the paragraphs in order that you may get the answers when these questions are raised.

Are the Molders to Blame?

A. NEMA never had more than 20% of the molders, it is quite true. There is no reason to believe that a new group will have more than 20% and there is certainly no reason to believe a new group will have more than 20%, and there is certainly no reason to believe that a new group will be able to build up a record that is any better than the past record unless they get definite government assistance. The futility of the organization is entirely due to the lack of response on the part of the molders themselves and had nothing to do with NEMA.

B. The assessments may be covered by an assessment of 1/2 of 1% but this means doubling or tripling of present expense as of NEMA.

C. Inasmuch as the molders had their own Section without any interference from NEMA and merely were affiliated with NEMA, in name, I don't see how the molders, if they continue their past attitude, can do any better by themselves in their own organization than they can in what practically amounts to their own organization in the past.

D. It is quite true that the molding industry is not a part of the electrical industry but the affiliation was made because they had a going organization, and the present proposition is a blind jump out of the window.

"Where Do We Go From Here?"

Your argument in favor of an alliance with other plastic material groups is very good provided there are such groups and provided there is a coherent set-up to tie to. As you know, my attitude to any change at the present time is the fact that it will introduce two very complicated problems where we already have one, and that is bad enough.

Your action is the proper way to approach the situation and I will be very much interested to hear from you as to the replies you receive:—G. K. Scribner, Boonton Molding Co.

Votes Independent

The question is, in our opinion, one which vitally concerns the molders particularly since the trade's past experience along these lines has been rather disappointing. This question has had our attention for some time and we have concluded that a strictly independent organization would serve best and we therefore marked the card that way.

We would be glad to participate in any meeting called for the purpose of getting such an organization established. We believe that this meeting should be called at the earliest possible date. We thank you for your interest and efforts in our behalf:—H. J. Grigoleit, The Grigoleit Company.

Wants Some Action

We are thoroughly in accord with the idea of quick action and in fact took occasion to write Mr. Woodruff several days ago on this subject. We appreciate your interest in the matter and hope that some good may result therefrom:—Edward F. Bachner, Chicago Molded Products Co.

Questions Nema Ability

I cannot help being governed by the lack of results obtained for the plastic molders through their affiliation with N.E.M.A. For two or three years the members of the plastic industry including ourselves were promised a uniform cost system to help the industry from selling goods at a loss knowingly. Up to this writing the writer does not know that this has been accomplished.

More can be accomplished for the benefit of plastic molders in their having an independent association perhaps affiliated with the raw materials and other plastic fabricators.

We do not consider the expenses of N.E.M.A. as small; we consider them very large for the benefit obtained, and it will be very hard to get co-operation of the necessary two-thirds, if it is an N.E.M.A. proposition.

We think the expenses of an independent organization can be handled for less money than in connection with the N.E.M.A., and, that \$50,000 is an excessive amount. We cannot understand why an organization representing the magnitude of business of the plastic molders and the number engaged in the industry would not receive recognition from the administration in Washington. It is our judgment, although we have no figures upon which to base it, that the electrical industry does not consume over 25% of plastic molding.

We agree that it is now time to set up an ideal trade organization.

Plastic molders are largely made up, so far as number is concerned, of small units, and have in mind that belonging to N.E.M.A. they do not and will not receive consideration that they would in a group by themselves. We are most willing to

co-operate in any plan that will be of benefit to the industrial situation as a whole and to the plastic molders whereby they will be able to do their part, and at the same time make a reasonable profit, and will be protected from any aggressive attitude by firms that the molding part of their business is a very small division:—J. H. Parker, President, Union Insulating Co.

My feeling has been that we could make best progress at the outset at least in availing ourselves of the standing and machinery available in N.E.M.A., however, there appears to be a feeling, among a great many of the molders, against any affiliation with N.E.M.A. I seriously doubt whether this prejudice could be overcome. For that reason, I vote for alliance with material producers and plastic fabricators.

An independent molders association would be possibly the ideal set-up, but there are many factors militating against this course—first of all the expense of organization would be very considerable and even with all molders substantially organized, the unit would still be a very small insignificant body, and would in all probability have great difficulty in getting the proper hearing in Washington:—Prescott Huidekoper, President, American Insulator Corp.

For No Association, Nohow!

Our reply will be the same as the two replies which you have listed: "No interest in no association no how."

We might, of course, use a little better grammar, but we are continuing with our decision of seeing what the developments are as far as the Government is concerned and as to what the results will be of its hearings on the codes representing the ten major industries of the United States. The result of these investigations will establish many precedents in the various industries of this country.

Our decision does not merely apply to this company, but as well to our subsidiaries, The Watertown Manufacturing Company, Watertown, Conn., and the Specialty Insulation Mfg. Company of Hoosick Falls, New York.—Carl F. Siemon, President, The Siemon Company.

In this critical situation, the raw material producers recognize their stake in the interests of the molding industry and the very great gain that they would win if trade practices were cleaner and price cutting controlled. Expressive of their attitude is the following letter from L. M. Rossi, Vice-President, Bakelite Corp., who has charge of the problems for two companies raised by the Industry Recovery Act:

It would be my personal reaction that the molders as a group have not sufficient interests in common with NEMA to justify their affiliation with the NEMA organization.

My own opinion would be that the molders would be better advised to proceed quite independently in forming their own organization and establishing their own code. If later it should develop that through convenience or necessity they affiliate themselves with a larger group, they would form a much more cohesive subsection with their own code already prepared, than simply to drift into some larger association separately and hope that the code of the larger association would fit their needs.

Echoing this interest of the raw material producers in the molding and fabricating industries, William Callan, President, Casein Company of America says:

Any efforts of the raw material producers to better business conditions can be completely nullified by their customers in the molding and fabricating groups. Therefore, I feel strongly that the manufacturers of plastic materials should, when they set up their organization, provide for active co-operation with their various groups of customers in the plastic fabricating fields.

Midget Radios

versus

Electric Clocks

By Franklin E. Brill

MOLDERS with an analytical mind will see in the wave of molded midget cabinets an exact parallel to the electric clock stampede of a few years ago. Timepieces were emerging from the Grandfather clock stage, just as radios are coming out of the "console" period today, and in this stage of shrinkage both turned to plastic materials to reduce production costs, and to eliminate finishing and assembly operations.

Both industries, however, made an unfortunate mistake during their shrinkage period. Both of their products had previously been furniture, and as they shrunk to accessory size, they failed to re-value radio's place in the home, and continued designing furniture. Even in their molded cabinets they tried to imitate the coloring and texture of cabinet woods, using "walnut" and "mahogany" molding compounds. We remember what happened in the clock field—how "walnut" Gothic clock designs multiplied like guinea pigs, bored the consumer with their ugly, cheap look, which naturally broke prices, and turned clock manufacturers away from plastic materials.

The fault, of course, is not in the material. Correctly handled, plastics are rich-looking. But when they are made to look like wood, but obviously are not wood, they look like cheap substitutes to the consumer, who need only touch their surface to tell. And that is what most radio manufacturers are doing today—using wood imitation molded cabinets—and very little is being done to keep them from repeating the fiasco of their brother industry, electric clocks. Already midget prices have slumped from thirty dollars to around ten, largely because most of the sets are not rich-looking enough to hold their original price in the face of competition.

This price slump was in full swing when Colonial Radio Corporation of Buffalo decided, a few months ago, to enter the midget radio field. The chances of "just another midget" becoming a profitable item, they knew, were very slim, and having nothing mechanical to offer other than a five-tube super-heterodyne, all-wave circuit, which was what competition was offering, they decided that cabinet design was the only other variable. By "designing up" to a thirty dollar retail price they could get distribution more easily through larger dealer discounts, reach a new market heretofore not interested in price alone, and for the first time offer a set but slightly higher in cost than the cheaper-looking midgets which would be bought largely as a smart, modern accessory.

These were the premises on which Jan Streng, a New York design consultant, set to work. His use of plastic materials is very intelligent, as shown by the finished set (August issue). By merely being obvious about what the material is, by using it as a plastic material instead of a cheaper substitute for wood, he achieved an exceedingly desirable object. Also by recognizing the contrast in values between plastics and metal, he combined decorative accents and functional parts such as feet, handle and grille very attractively. He kept the lines of the cabinet simple, to lower mold cost, and also because a simple object draws the eye in the average cluttered home and retail display.

A New Base for Phenolic Resin Laminating

By P. W. Jenkins and A. W. Coffman
Industrial Fellows, Mellon Institute of Industrial Research

RECENTLY a new method of bonding, employing a relatively soft metal as an adhesive, has been proposed for the attachment of fibrous materials to steel.¹ The fundamental idea of using such metallic adhesives² has been developed to commercial practice in Robertson Bonded-Metal, consisting of steel sheets to which have been adhered surfaces of a wide variety of fibrous substances. Certain types of this new material of construction ("R-B-M") have been found to lend themselves to resin finishing, and it is the object of this article to indicate the method of fabrication, the most logical procedure for employment of the product as a laminating base, and the possible advantages that it offers to the laminating industry.

While the material is described specifically for consideration as a base for phenoplastic laminating, and hence the data presented have been compiled with special reference to phenolic resins, the authors feel that, in general, the conclusions reached are applicable to other resins.

When fibrous materials are pressed onto metals coated with suitable soft metals or alloys, slight adhesion of fiber to metal

is observed in certain spots over the surface of the metal, even at room temperature. Increasing the temperature of the metal progressively improves such adhesion. It has been found that when conditions of temperature, pressure, and final cooling are properly adjusted, an adhesion of fibrous materials is obtained

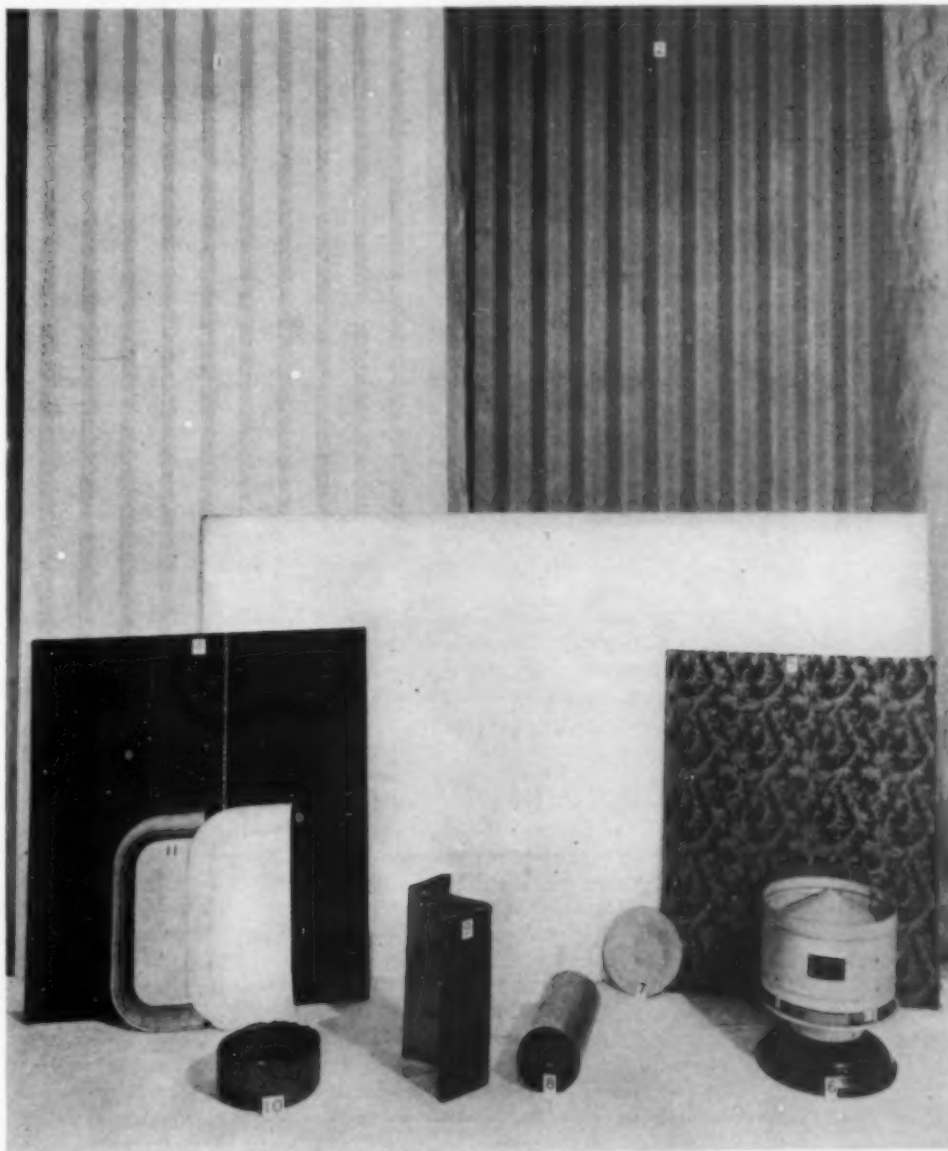


Figure 1.—Flat and formed R-B-M specimens surfaced with (1) asbestos felt, (2) colored cotton-wool felt, (3) alpha-cellulose paper, (4) $\frac{1}{4}$ " black wool felt, (5) figured cotton fabric, (6) asbestos felt, (7) cotton felt, (8) same as (4), (9) $\frac{1}{2}$ " hair felt, (10) same as (2), and (11) same as (7).

that is sufficiently satisfactory to permit the working and forming of the composite material (Figure 1).

Zinc, lead, tin, and alloys of these metals have been used as adhesives. Terne alloy (15-22% tin and 85-78% lead) lends itself particularly well to the process and has been successfully used in attaching the following surfacing materials to steel:

<i>Papers</i>	<i>Felts</i>	<i>Fabrics</i>
100% rag	Asbestos	Cotton
Asbestos	Rag	Wool
Mixed rag and sulfite	Cotton	Linen
Alpha-cellulose	Mixed cotton and wool,	
Mixed cork and hemp	up to 92% wool	
	Mixed cotton and rayon	
	Jute	
	Hair	

The method of applying these various fibrous layers to steel may be described briefly as follows: Sheet steel is coated with the metal adhesive, as terne alloy, by the usual commercial hot-dip method. The temperature of the coated sheet is then brought to that point at which it has been found that maximum adhesion is obtained, approximately the melting point of the adhesive in most cases, and at this point the fibrous layer is pressed on by a rolling operation. As the fibrous layer is applied, the sheet is simultaneously cooled below the charring point of the paper, felt, or fabric. Under the rolling pressure, the liquid or semi-liquid soft alloy is forced into the interstices of the fibrous material, and, upon cooling, forms a permanent metallic bond.

Several types of fibrous coating applied to sheet steel by this process are shown in Figure 1. The formed specimens pictured therein demonstrate the plastic nature of the adhesive layer and its ability to deform without permitting failure of the union between the fibers and base metal. The metallic nature of the adhesive at once indicates excellent resistance to moisture effects. Elevated temperatures up to the melting point of the bonding metal, and continued and rapid temperature changes below this limit, have no deleterious effect on the junction between fibrous layer and steel. These properties are of primary importance in a consideration of the material as a base for resin laminating.

In considering the use of R-B-M as a base for the application of pressed resin finishes, interest is centered primarily in those applications where the choice of finish is dependent upon the properties of molded resins related to decorative value and resistance to exposure conditions. The field of building construction offers many such applications and is of particular concern in view of the potential outlet involved. The properties that make the molded resins desirable here are fully served in many instances, and most economically, through the use of the pressed resin in the form of a thin veneer applied over a backing of some more utilitarian material, such as steel, which supplies the desired mechanical properties.

A variety of materials have been proposed as this backing member for glued-up panels and sheets having surfaces of pressed or laminated resin veneers. Among these may be mentioned plywood, cement-asbestos board, pressed boards of various sorts, and specially treated sheet steel. The requirements imposed upon the core or backing material are as follows: that it possess adequate mechanical strength, that it have a degree of inertness to exposure conditions comparable to the veneer surface that it is to support, and that it present a surface suitable for the application of glue as may be required by the nature of the veneer. This latter requirement presents the greatest difficulties. Especially is this true in the case of sheet steel, which is, in many instances, the most desirable material in the light of the other requirements.

A number of these composite structures in the form of panels and fabricated sheets are now being utilized by the building and furniture trades. The general procedure followed in building up these products entails a laminating operation for the production of the pressed resin sheets, preparation of the surface of this laminated sheet and of the supporting member for the application of glue, and finally the gluing operation. The technique and the materials employed in the laminating operation are well known

and require no comment here other than to point out that surface finish is of primary importance. A minimum thickness of approximately 1/16" for the laminated resin sheet is set by conditions imposed by press tolerances, handling and trimming operations, and the like. It is the practice to sand the back side of this veneer sheet before the application of the adhesive. The preparation required for the surface of the supporting member is dependent upon the nature of the material used and the type of adhesive to be employed. In all cases it is essential to have perfectly plain surfaces in order to secure intimate and uniform contact in the gluing operation. The choice of available adhesives suitable for attaching the veneer to the backing material, and resistant and durable enough to satisfy the requirements of the composite structure, is rather limited. Phenolic resin varnishes and special rubber cements have been developed for the purpose. The latter is the most favored for applying veneer to sheet steel backing, well cleaned and etched steel or galvanized surfaces. The actual gluing operation is carried out under the application of heat and pressure, the conditions again varying with the adhesive used.

R-B-M as a Laminating Base

Experiments have shown that certain forms of R-B-M may be processed to give a finished product equally attractive in appearance but with certain advantages not present in the above described product. The use of this process enables certain shortcuts in the usual procedure that are of economic significance in considering this sort of material in the highly competitive field of building construction.

The fiber-coated metal, R-B-M, may be regarded either as a steel sheet with an applied surface particularly adapted to provide anchorage for an adhesive, or as a fabric reinforced with a steel sheet. In the light of the first consideration, it fits admirably into the general procedure employed in preparing veneered sections. The surface of fibrous material, asbestos, cotton fabrics, or alpha-cellulose paper, as the case may be, offers ideal anchorage for the adhesive and, when penetrated by the adhesive, gives a fiber-reinforced glue line with both fibers and adhesive attached to the metal. The fibrous layer also serves a very important function in supplying a cushioning effect between the relatively non-compressible metal and veneer layers, and thereby insures uniform contact and adhesion in the gluing operation. Mechanical tests on specimens of veneered R-B-M and on specimens prepared by gluing the veneer of laminated resin directly over etched steel have shown that the greatest source of weakness in this latter assembly is the non-uniformity of the bond obtained; in comparison, the presence of the fibrous layer on R-B-M results in consistently high strength values.

In most cases it is preferable to consider R-B-M as a fabric or paper reinforced with sheet steel. Laminated resin is made by superimposing layers of resin-impregnated fabric or paper, and combining them, under the simultaneous application of heat and pressure, into a dense, solid, homogeneous sheet. It has been found to be perfectly feasible to substitute a sheet of R-B-M, with the fibrous surface layer or layers impregnated with resin, for all or part of these fabric or paper layers, to get a strong laminated sheet of similar appearance but having a steel core or backing. The procedure to be followed in utilizing R-B-M in this manner departs from that commonly employed in producing laminated resin sheets only in respect to certain mechanical changes in the saturating operation made necessary by the fact that the metal-reinforced fabric or paper must be handled as a more or less rigid sheet. Apart from this requirement, the treatment is identical with that of the ordinary sheet of resin-saturated laminating paper or fabric. One pressing operation, corresponding to that employed in producing the laminated resin veneer alone in the previously discussed procedure, is all that is required to produce a finished veneered steel panel. Economies in time and in materials are secured through the elimination of the operations involved in attaching preformed laminated veneer to the backing, and through the use of thinner surface layers made pos-

sible by the elimination of all handling ordinarily involved in the use of laminated veneer.

R-B-M having surfaces of asbestos felt, alpha-cellulose paper, cotton felt, or cotton flannel has been found well suited to the laminating operation. Veneered steel panels presenting very attractive surface effects may be obtained by selecting these fibrous layers in colors or in printed designs, saturating with resin varnish, drying to remove the varnish solvent, and subsequently pressing to cure the resin and to secure the desired pressed finish. Surface designs and color effects may also be obtained, without complicating this simple procedure, by superimposing a layer or layers of resin-saturated decorative fabric or surface paper over the R-B-M sheet in the laminating operation. This procedure is particularly practical in that it permits a greater latitude of possible panel effects obtainable from a stock of some standard form of R-B-M.

Under the combined action of heat and pressure, the resin-saturated fibrous layers on the R-B-M sheet, plus additional surface layers as may be added, are converted into a thin veneer sheet of laminated resin that is firmly attached to the metal base. In order to evaluate the strength of the bond secured, strips of R-B-M, with surface layers saturated with phenolic resin, were laminated together so as to get an area of $1\frac{1}{4}$ sq. in. in contact. The strips were subsequently pulled in tension on an Amsler testing machine to obtain failure in shear. The manner in which the strips were assembled and the method of testing are shown in Figure 2. The completed assembly may be considered as a strip of steel attached to a strip of reinforced laminated resin through the medium of the metallic fiber-metal bond. A representative series of test results obtained by this method on R-B-M surfaced with cotton fabric is recorded in Table I.

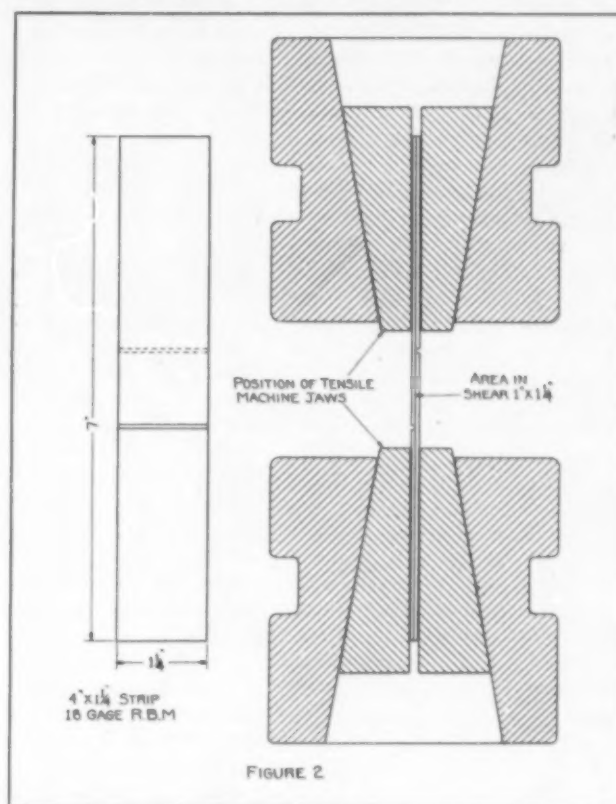
TABLE I
Shear Strengths of Metal-Laminated Resin Bond
in Lbs. per Sq. In.

R-B-M—Laminated	Steel-Laminated (Resin Adhesive)	Steel-Laminated (Rubber Cement)
1460	835	1020
1400	925	960
1410	790	1150
1350	885	880
1360	980	890
1470	935	900
1300	840	915
1520	1020	940
1420	1080	1020
1490	1020	1010
1180	1040	875
1270	880	880
Ave. 1386	936	953
145%	98%	100%

This table also gives comparative results on the strength of bond obtained between steel and laminated resin in similar assemblies through the use of a phenol-formaldehyde resin varnish or a rubber cement as the adhesive. The results recorded for the shear strength developed between steel and laminated resin, using phenolic resin as the adhesive, were determined on test specimens made by laminating together strips of steel and strips of cotton fabric surfaced R-B-M in the same manner as described in the preceding paragraph. The R-B-M strips were saturated with the resin varnish. The steel strips were roughened by pickling in acid solution to produce a well etched surface and subsequently coated with a thin film of resin varnish. The varnish treated strips were dried to remove the solvent and then pressed together under the same curing conditions as employed in laminating the R-B-M strips for the test as recorded in Table I. A well-known proprietary brand of cement was used in determining the strength of bond supplied by rubber cement. Strips of etched steel and of laminated resin with surfaces roughened by sanding were coated with this cement and pressed

together according to the procedure recommended by the manufacturer.

The results of these shear strength tests show that the metallic fiber-metal bond present in R-B-M produces approximately a 45% higher bonding strength than obtainable over roughened steel surfaces through the use of the adhesives and the bonding methods commonly employed. While it is not supposed that these laminated products would often be subjected in use to any



single mechanical stress great enough to exceed even the weakest of these bonds, it must be borne in mind that all strains set up in such rigid sections do result in shear strains at the junction of the laminated resin layer and the reinforcing base. Any flexing action that may occur in the handling or installation of the products results in such strains. The bond is also called upon to withstand the movement, or the tendency to move, produced by every change in temperature because of the unequal thermal coefficients of the united layers. The repeated action of these stresses over periods of time has been found to produce a cumulative effect that results in separation of the laminated layers in cases where the initial bond is too weak or where the bonding material is too brittle in nature. Laminated R-B-M panels have been subjected to long cycles of sudden changes from the temperature of dry ice to 150° F. without showing any indication of bond failure. This is attributed to the fact that the glue-metal union, as commonly attained, is supplemented by a fiber-metal bond provided by the metallic adhesive.

Another method of comparing the quality of the bond secured between laminated resin veneer and metal was brought out in testing the reactions of these laminated sections in transverse bending. It was found that in some cases bonds were obtained that were sufficiently strong to withstand flexure of the composite structure up to, or beyond, the point of rupture of the laminated resin layer itself, whereas in other cases the bond failed at some lower value, owing either to the nature of the adhesive or to a weakness in the gluing method. It is obviously desirable that the bond be strong enough to satisfy the first case. A series of test results are recorded in Table II on transverse strengths of laminated panels made up according to the several procedures that have been discussed. One set of test specimens was made by gluing a sheet of laminated resin, approximately 1/16" thick,

over a sheet of well etched 18-gage steel by means of a rubber cement, according to the accepted procedure. This same thickness of laminated resin was also bonded to treated steel with a heat-reactive phenolic resin. A comparable veneered R-B-M panel was made by applying such a thickness of laminated resin over the resin-saturated fibrous layer on 18-gage metal as to give a total thickness of laminated veneer on the pressed-up panel equivalent to that applied to steel on the other two panels. The metal thickness and the total veneer thickness were thus the same in all three cases. As for the shear strength tests, the laminating conditions employed in attaching the veneer to the R-B-M and to steel with resin adhesive were identical, so that these two panels differed only in the type of bond produced.

These three panels were cut into 8" x 1½" strips to get a series of test specimens differing in construction only in the manner of bonding. The strips were supported on knife-edges over a 6" span and tested to failure in transverse bending under the action of a slowly applied center loading.

The results of these bending tests, as recorded in Table II, indicate that the reaction of the laminated structures in bending is a function of the strength characteristics of the metal and the veneer layers as long as the bond between the two is strong enough to withstand the maximum flexure permitted by the veneer layer. They show that the bond secured by any one of the three methods employed may be of this order. It is also shown, however, that the practice of gluing relatively non-compressible layers together by means of thin glue films is likely to result in inconsistencies in the strength of bond secured. Two out of the six strips cut from the panel made by gluing the veneer to treated steel with phenolic resin, and three of the six glued up with rubber cement, failed because of the shearing apart of the metal and the veneer at the glue line before the maximum flexure of the veneer layer was reached. These cases of bond weakness are attributed to such factors as variations in thickness of the laminated resin and of the metal, resulting in uneven pressure distribution in the gluing operation and variations in the surface presented by the steel and in the glue film thickness.

TABLE II
Transverse Bending Test

Base Material and Adhesive	Thickness of Laminated Strip In.	Maximum Load in Lbs.		Maximum Deflection In.	Modulus of Rupture
		Tension	Compression		
18-gage R-B-M resin-saturated	.1205	98.0	.....	.588	40,500
	.1210	96.5	.....	.588	39,500
	.1210	102.0	.....	.600	41,800
	.1210	.....	106.0	1.5	.....
	.1215	.....	104.0	1.5	.....
	.1215	.....	104.0	1.5	.....
18-gage pickled steel phenolic resin	.1210	101.0	.....	.575	41,500
	.1210	103.0	.....	.600	42,200
	.1205	88.5*	.....	.475	36,600
	.1215	.....	106.7	1.5	.....
	.1195	.....	97.5	1.5	.....
	.1200	.....	87.0*	.212	.....
18-gage pickled steel rubber cement	.1190	93.5	.....	.675	39,600
	.1200	70.0*	.....	.650	30,000
	.1215	79.5*	.....	.625	32,300
	.1210	.....	78.0*	.725	.....
	.1205	.....	99.5	1.5	.....
	.1210	.....	98.0	1.5	.....

*Failure caused by shear at the glue line.

The weakness of these two practices lies in the difficulty of eliminating all these variations, particularly in commercial scale operation. Superior bond strength is secured with R-B-M, and the presence of the cushioning layer of fibrous material is shown to produce a uniformly good union.

The mechanical properties of laminated R-B-M sheets may be varied over a wide range, according to the gage of metal employed and the thickness of veneer layers built up. The relative thickness of the steel and the veneer layers, and their relative positions with respect to applied stresses, determine whether these properties more closely approach the corresponding properties of an equivalent thickness of steel or of laminated resin. The transverse strength of the particular combination of R-B-M and veneer as recorded in Table II, for example, is over 100% greater than the strength developed by the equivalent thickness (0.121") of laminated resin and about two-thirds of that of the same thickness of mild steel. This combination also shows about the same percentage increase in stiffness over that of the same thickness

of laminated resin. The stiffness factor is more important in many applications for panels than the ultimate strength in tension or in bending.

The most economical combination is that in which the metal is designed to supply all the desired strength and stiffness, depending upon very thin veneer layers only for surface effects. For all applications, such as decorative panel work, where the life of the material is dependent upon the surface resistance of the pressed resin layer, this combination serves the purpose equally as well as a panel built up with a much thicker veneer layer. Permissible weight considerations, however, may demand a compromise in some cases. As brought out in the foregoing discussion, R-B-M, together with the simple laminating procedure involved in surfacing it with resin finishes, permits of wide flexibility in this respect.

The fact that R-B-M lends itself very well to the application of very thin veneer layers by a simple laminating operation is of importance from another angle related to mechanical properties. All combinations of dissimilar materials are subject to a tendency to warp owing to unequal thermal expansion. For many applications where laminated resin veneers have been employed, it has been found necessary to apply the same thickness of veneer to both sides of the supporting member in order to get a balanced construction. The use of the very thin veneer layers as rendered practical by R-B-M not only minimizes this warping tendency, and the related difficulties of fastening so as to maintain a flat surface, when applied to one side only, but also enables the production of a balanced construction through the application of layers of pressed resin over both sides of a total thickness no greater than that applied to one side only in the accepted procedures.

The characteristics of Robertson Bonded-Metal appear to be advantageous for its use as a laminating base. It may be treated as a sheet of metal-reinforced paper or fabric which, in the hands of a resin laminator, may be simply and readily converted into a finished veneered-steel panel. Its use leads to the elimination of a number of difficult and bothersome operations heretofore involved in attaching resin veneers to steel. The bond between the steel sheet and pressed fibrous layers as secured through the use of the metallic adhesive is shown to be of a high order and to contribute to the superior resistance of the composite structure.

1. Chem. Met. Eng. 39, 144 (1932).
2. U. S. Patent 1,862,332, June 7, 1932.

Abrasive Materials Industry, 1932

The year 1932, according to the U. S. Bureau of Mines, was one of decreased output in miscellaneous natural abrasives. Most of the producers reported decreased sales, although a few reported increases in output as compared with 1931, and a few reported slightly higher selling prices over the preceding year.

The following table shows the quantity and value of natural abrasives sold or used by producers in the United States in 1932, with 1931 for comparison:

Commodity	1931		1932	
	Short tons	Value	Short tons	Value
Emery.....	512	\$5,557	250	\$2,781
Garnet.....	2,946	193,015	1,950	147,350
Grinding pebbles, and tube-mill lining...	2,024	26,211	976	13,070
Grindstones.....	6,994	221,272	6,001	158,566
Millstones, chasers, and dragstones.....	.....	5,330	.....	4,450
Oilstones, whetstones, hones, scythe-stones, and rubbing stones.....	370	81,951	331	63,960
Pulpestones.....	1,730	120,877	1,667	88,874
Pumice.....	68,819	338,586	53,214	235,204
Tripoli.....	26,682	310,131	14,775	232,700

In addition, there were manufactured and sold during the year 38,910 short tons of artificial abrasives, valued at \$2,876,748, compared with 44,368 short tons, valued at \$3,918,109 in 1931. These were divided as follows: Carbides, 11,593 short tons, valued at \$1,066,064 (8,193 tons, \$967,840 in 1931); aluminum oxides, 18,835 short tons, valued at \$1,400,420 (25,070 tons, \$2,336,586 in 1931); and metallic abrasives, 8,482 short tons, valued at \$410,264 (11,105 tons, \$613,683 in 1931). It will be noted that there was an increase of 3,400 short tons of silicon carbide in 1932 over 1931.

The Methylene Ether-Esters

A Promising Group of New Solvents and Plasticizers

By Frederic Walker

THE methylene ether-esters are an interesting group of organic compounds which can be easily synthesized in good yields by the action of chloromethyl ethers on the salts of organic acids. The reaction which takes place when the sodium salt of an organic acid is used is shown below:

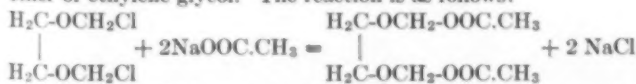


In this equation, R and R¹ represent organic radicals such as CH₃, C₂H₅, C₆H₅, etc. Since the reaction is fairly general, R and R¹ can be varied within wide limits. The dichloromethyl ethers of glycols and the salts of dibasic organic acids can be used. Accordingly, a great number of ester-like compounds with various boiling points, different solvent powers, and different degrees of stability can be prepared. Since the chloromethyl ethers can be made by the action of hydrogen chloride on an equimolar mixture of formaldehyde and an alcohol, the methylene ether-esters can be prepared from simple and in many cases inexpensive raw materials.

Ethoxymethyl acetate was prepared by Gaspari¹ in 1897. Since then, many other members of this group of compounds have been prepared from monochloromethyl ethers and the salts of aliphatic acids. Preparations are described by Clark, Cox, and Mack², and by Farren, Fife, Clark, and Garland³.

Properties of Methylene Ether-Esters

In this work, fourteen ether-esters have been prepared which have not been described previously in the literature. Of these, the compounds which have been derived from aromatic mono- and di-basic acids are of particular interest, since they differ quite markedly from the other members of the group. The diacetomethyl ether of ethylene glycol is also of interest. It was prepared by the action of sodium acetate on the dichloromethyl ether of ethylene glycol. The reaction is as follows:



The dichloromethyl ether of ethylene glycol does not appear to have been prepared previously although Farren et al. (loc. cit.) attempted to make it.

The following table gives a list of the compounds that were prepared together with their approximate boiling points, relative hydrolysis rate, and the yields in which they were obtained. The relative hydrolysis rates were determined by agitating the compounds with water at room temperature and determining the amount of acid liberated by hydrolysis. The figures indicate roughly the approximate per cent. of hydrolysis after five hours agitation.

The starred compounds are compounds whose preparation has been reported previously in the literature.

	Molecular weight	Approx. B.P. °C.	Yield	Relative Hydrolysis Rate
Methoxymethyl Acetate*	104	118°	91%	Rapid
Ethoxymethyl Acetate*	118	132°	95	"
n-Propoxymethyl Acetate*	132	150°	46	"
n-Butoxymethyl Formate	132	154°	93	"
n-Butoxymethyl Acetate	146	169°	95	3.0%
i-Butoxymethyl Acetate	146	161°	72	2.3%
n-Butoxymethyl Butyrate	174	183°	95	0.9%
i-Butoxymethyl Butyrate	174	178°	88	0.7%
Methoxymethyl Benzoate	166	238°	93	0.6%
i-Butoxymethyl Benzoate	208	256°	88	0.1%
Methoxymethyl Salicylate	182	-b	81	3.4%
n-Propoxymethyl Salicylate	210	-b	82	1.6%
Dimethoxymethyl Phthalate	254	-b	78	27%
Di-n-propoxymethyl Phtha.	310	-b	82	14%
Di-i-butoxymethyl Phthalate	338	-b	75	6%
Sym. Ethylenedioxyethyl Acetate	206	230°	74	14%
Propoxypropyl Acetate	160	160°	56	Rapid
Methylene Butyrate*	188	220°	28	1.8%

Notes:

(a) These compounds were prepared by the modified procedure in which the salt is removed from the reaction product with water. The method gives low results with propoxymethyl acetate because it is easily hydrolyzed.

(b) The actual boiling points of these compounds were very high and could not be determined because they decomposed with gas evolution when heated from 180° to 200° C. at atmospheric pressure. They could not be distilled below this temperature range even at a pressure of approximately 15 m. m.

(c) The boiling point determinations were made by the Siwoboloff method⁴. These determinations and the hydrolysis tests were made on specially purified fractions of the compounds.

In general, the methylene ether-esters are colorless liquids possessing fairly high boiling points. They have a pleasant fruity odor except for the lower members of the series such as methoxymethyl acetate and ethoxymethyl acetate which hydrolyze in the nostrils producing an after-odor of formaldehyde. Those having molecular weights of 200 and over are almost odorless. Except for the lower members of the series, they are insoluble in water but easily miscible with organic solvents. In general, their densities fall between 0.95 and 1.05. Although the lower members of the group are easily hydrolyzed, the higher members are fairly resistant to hydrolysis.

The more unstable ether-esters develop a slight odor of formaldehyde on standing. This is probably due to hydrolysis brought

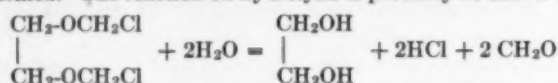
about by the presence of traces of moisture. When the hydrolysis was determined by titrating with N/10 alkali, however, it was found that the actual per cent. hydrolysis was very slight even when the odor of formaldehyde was comparatively strong.

As a rule, the stability of the methylene ether-esters against hydrolysis, increases with increasing molecular weight. With the aromatic derivatives, however, there seems to be an exception to this rule in that the benzoates are more stable than the salicylates and these are more stable than the phthalates.

Methylene butyrate and propoxypropyl acetate are included in the above table so that their properties may be compared with those of the methylene ether-esters. Methylene butyrate is a di-ester of methylene which is prepared by the action of butyric anhydride on paraformaldehyde in the presence of anhydrous zinc chloride. Propoxypropyl acetate is prepared by the action of alpha-chlorodipropyl ether on sodium acetate. The chlorodipropyl ether is prepared by the action of hydrochloric acid gas on an equimolar mixture of propyl alcohol and propionaldehyde. On standing, it breaks up into propionaldehyde, acetic acid, and propyl alcohol. After its preparation, the compound was identified by an approximate molecular weight determination by the Dumas procedure. A value of 175, (Theory = 160) was obtained. This shows that we were not dealing with a mixture of propionaldehyde, propyl alcohol and acetic acid.

In general, the method of synthesis, together with the properties of the compounds, were considered as sufficient for the identification of these products. The work of previous investigators has shown the general nature of the reactions involved and the properties of the products showed them to be compounds of the type indicated by the theory. In the case of the dialkoxymethylphthalates, the yield of product indicated that two moles of chloromethyl ether had reacted with one mole of disodium phthalate. The reactivity of the products with alkali also indicated that we were not dealing with compounds possessing a free carboxyl group as would have been the case if only one mole of chloroether had reacted.

The identity of the dichloromethyl ether of ethylene glycol was established by the mode of synthesis, the properties of the product, the behavior of the product on hydrolysis, and its reaction with sodium acetate. The compound was a viscous liquid which distilled at 97°-99° C. at a pressure of approximately 13 mm. It was heavier than water and did not mix with it. On standing with water, however, it gradually reacted with the evolution of heat forming water soluble products. Analysis of the solution obtained when a sample of the compound was hydrolyzed by water showed that hydrogen chloride and formaldehyde were formed. The reaction on hydrolysis is probably as shown below.



The compound reacted with sodium acetate to give a new compound possessing the properties of an ether-ester. This compound was probably sym. ethylenedioxyethylacetate. The hydrolysis of this compound with alkali gave results which are in quantitative agreement with the theory.

Preparation of Methylene Ether-Esters:

The compounds were prepared by the reaction of almost equimolar quantities of the desired chloromethyl ether and the anhydrous sodium salt of the organic acid. In general, a small excess (2%-5%) of the sodium salt was employed. This did not seem to influence the yield to any extent and was probably unnecessary. In later experiments, the purely theoretical quantities were employed. The reaction took place spontaneously at room temperature with the evolution of heat. The reaction mixture was then heated on the steam bath from fifteen minutes to one hour. Two methods were employed for the separation of the product from the reaction mixture. The first method was the one used by former investigators and consisted in distilling the product from the reaction mixture at ordinary or reduced pressure.

The second method was used for the isolation of ether-esters which were not easily hydrolyzed and gave much better results

than the other procedure. It was absolutely essential for isolating the phthalate derivatives which could not be distilled. It consisted in adding water to the crude reaction product. The water dissolved the sodium chloride which is the other product of the reaction and the ether-ester was separated as a clear non-aqueous phase. It was then dried with calcium chloride and distilled if this was desired, or if not it was purified by treatment with activated charcoal followed by filtration.

Preparation of the Dichloromethyl Ether of Ethylene Glycol:

This compound was prepared by treating two moles of formaldehyde in the form of paraformaldehyde or the aqueous solution with one mole of ethylene glycol and saturating the resultant mixture with hydrogen chloride. The reaction mixture separated into two clear colorless phases when treated in this way. The product was the lower phase. It was separated with a separatory funnel, dried with a little calcium chloride and vacuum distilled. When paraformaldehyde was used, the yield was approximately 65%; when the aqueous solution was employed, it was about 45 per cent.

Hydrolysis Test:

Two cubic centimeter samples of the pure compounds were placed in 100 cc. flasks with 50 cc. of water and then placed in a mechanical shaker for 5 to 16 hours at room temperature. The mixture was then titrated with 0.1 N alkali. A blank titer was always made by titrating a fresh mixture of ether-ester and 50 cc. water. This titer was subtracted from the titer obtained in the test and the per cent. hydrolysis was calculated from the difference of these two figures. The following equation shows what happens in the hydrolysis.



As will be seen, one mole of acid is produced for each mole of ether-ester that is hydrolyzed.

Four or five hydrolysis tests were always run simultaneously on different compounds. In the next set of tests, one or two of the compounds previously tested were run again. Hence, although the conditions of tests were always slightly different due to differences in room temperature, etc., it was still possible to make an accurate comparison of the hydrolysis rates of the compounds. Compounds that hydrolyzed very slowly were agitated with water for 16 hours. The results were all calculated so that they would indicate the approximate amount of hydrolysis produced by five hours of agitation. They give a good measure of the relative hydrolysis rates of the different compounds under the conditions of the experiment, but are only approximate as far as their absolute value is concerned.

Hydrolysis of Sym. Ethylenedioxyethylacetate:

Four gram samples of the compound were weighed out in thimble beakers and added to 50 cc. of N alkali. After approximately two hours, the excess alkali was titrated with N acid. The alkali consumed by hydrolysis expressed in terms of 1.0217 N acid is equivalent to the acid liberated by the compound on hydrolysis. From these were calculated the grams of product equivalent to one mole of alkali. These results were compared with the theoretical value for ethylenedioxyethylacetate. The data are shown below.

	Theory for	
	I	II (CH ₃ COO) ₂ C ₄ H ₈ O ₂ = 8-1
Weight of Sample.....	4.004	4.000
Alkali consumed in terms		
of 1.0217 N Acid....	38.30	38.18
Gms. Compound equivalent to one mole		
KOH.....	102.3	102.5
		103.0

The values are slightly lower than the theory; this is probably due to the fact that the formaldehyde liberated by the hydrolysis of the ether-ester consumes a small amount of the alkali because of the Cannizzaro reaction which takes place slowly in the presence of alkali.



1. Gaspari, *Gaz. Chim. Ital.*, 27, II, 297 (1897).
2. Clark, Cox and Mack, *J. A. C. S.*, 39, 712-716 (1917).
3. Farren, Fife, Clark, and Garland, *J. A. C. S.*, 47, 2419-2423 (1925).
4. Mulliken, "Identification of Pure Organic Compounds," Vol. I, p. 222.

Phenol Resin Gives New Tool to Marine Engineers

By Franklin E. Brill
General Plastics, Inc.

IMAGINE a steamship bulkhead panel made of real wood, very light in weight, extremely strong structurally, that will resist a direct flame for twenty-four hours with no effect other than charring of the surface. That is the revolutionary development made possible by the new resin bonded bulkhead panels, 425,000 square feet of which were used in the S. S. Washington, largest liner built in America recently launched at Camden and fastest cabin ship afloat.

The decorative advantages of wood have all been retained, and the resin bonded panels are easy to install, easy to finish, and easy to handle. In addition, the new process gives excellent thermal insulation, sound-and-vibration-deadening qualities, moisture and bacterial resistance, and a structural strength and fire-resistance never before possible in marine construction. It was developed by the Haskelite Manufacturing Corporation, in conjunction with General Plastics.

Here is the part the new resin glue plays. Asbestos paper is impregnated with phenol resin, giving it greater strength, and

making it impervious to moisture and air. A hardwood face veneer is glued to one side of the asbestos with colloidal resin, and a poplar veneer is glued to the other side with the same fireproof, moisture-proof and vermin-proof adhesive. Then the poplar veneer side of the built-up sheet is glued with the resin to both sides of a Balsa wood core, and the bulkhead panel is complete.

In this way, the special advantages of all the component materials are retained, and at the same time all of their disadvantages are overcome. For instance, asbestos was fire-resistant but neither attractive or strong. Balsa Wood was light in weight and a splendid heat and sound insulator—but it was highly inflammable. The thin hardwood and poplar veneers had too many limitations for marine construction when used in the conventional way. Now, with the new resin glue, the face veneer contributes an attractive lustrous surface, the specially-treated asbestos backing the face veneer acts as a fire-wall, and the Balsa wood core lends rigidity and insulating qualities—all



Fancy inlaid Haskelite panels used for wall paneling on "S. S. Washington."



Fire resistant resin-bonded panels used for bulkheads and ceilings in staterooms on "S. S. Washington."

without excess weight or bulkiness. And the resin glue is 100% waterproof, bacteria-proof, fire-resistant—and actually increases the panel's shear strength in the presence of moisture.

The perfection of phenol resin plywood glues such as the colloidal type came after years of study and experimentation. The idea is not new. Twenty years ago, wood experts were wondering whether the exceptionally tough and inert phenol plastic materials couldn't be used in some way for bonding veneers and plywood.

First, the most obvious form, resin varnish, was tried. Results were sometimes good, sometimes bad, this lack of uniformity being due to the uneven absorption by the wood. It was difficult to keep the varnish on the glue-line where it belonged, since it tended to creep into the wood. Then too, the difficulty of spreading it and its high cost served to keep it mainly in the realm of nice but impractical ideas.

The next step of the experimenters was to develop the film which could be slipped between the plies and which would carry the resin glue. This called for impregnation of paper sheets with the resin, on the theory that, when heated and compressed, the resin would flow out and form a double glue-line against each ply. It worked all right, and was a stride forward, but it often lacked flexibility, required predetermined impregnation, and was rather high in cost.

Finally, the colloidal suspension of resin was suggested as a means of distributing the resin over the panel. It was found that the colloid suspended the resin for proper distribution, checked excessive absorption, cut glue-line costs, and simplified handling and spreading. The Haskelite Corporation, which was carrying on the colloid research with the General Plastics laboratory, devoted all its efforts to this new form of resin, announcing a few months ago, that it had perfected the new resin bonding agent. A number of production runs of the Durez-bonded panels, previous to their S. S. Washington bulkhead contract, seemed to prove their contentions.

Ordinary glue spreaders are used, and the laminated panel is placed in a heated hydraulic press, where the resin sets up and cures in a comparatively short time. From then on the glue-line

is not affected by solvents or heat and can be worked immediately upon removal from the press. Plywood resin is also used for bonding wood to wood, wood to metal, and wood to phenolic sheet stock, giving a bond actually stronger than the wood fibre itself.

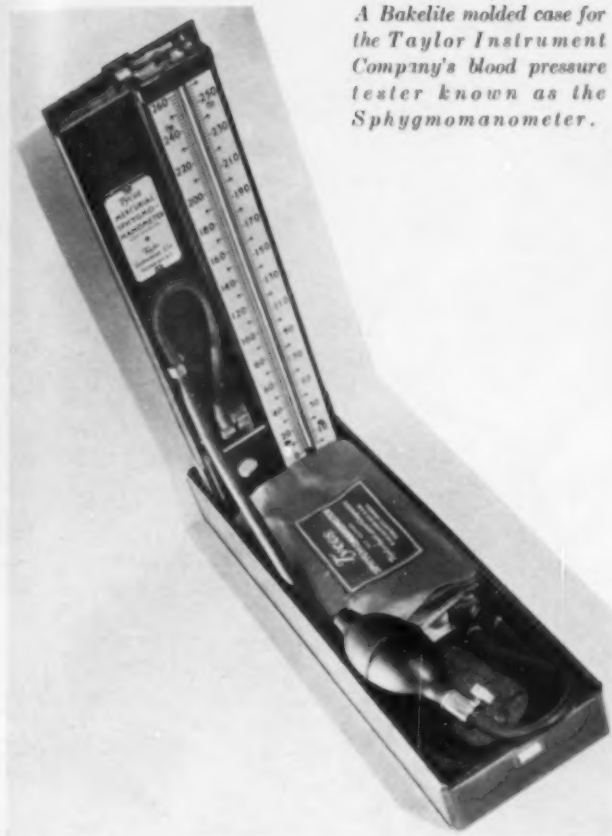
The built-up plywood panel, when bonded with the Durez resin, offers marine engineers virtually a brand new material, in as much as previous plywood bonded with animal, vegetable and blood glue was unsuitable for marine use, and ship architects had to compromise on materials like metal, which had numerous faults but which were the best then available. Now, however, they have at their command materials with all of the sympathetic and decorative attributes of fine natural woods, with all the fire-proof qualities of asbestos, plus easy installation, deadening of rattles and vibration, proof against warping, light weight, excellent thermal insulation, imperviousness to moisture and humidity, and proof against all sorts of vermin and fungicidal growths. New decorative and structural methods are now possible, with corresponding improvements in the standards of what may be called oceanic housing.

All thicknesses of resin-bonded panels can be made, varying from the inch-and-three-quarters Balsa-wood core panel used in the Washington to quarter-inch three-ply sheets or multi-ply panels several inches in thickness. All of them can be fireproofed in the same invisible but completely effective method with resin impregnated asbestos, and all of them will have the same qualities of moisture resistance, light weight, insulation, strength, and proof against deterioration. For the first time in many years, marine architects have a new tool.

This Month's Cover

Every article displayed on the cover is of plastic interest. A wide range of applications of Catalin in connection with smokers and game accessories is shown. Pipes and cigarette holders manufactured by Reiss Premier Pipe Co.; poker chips and slide, Arthur Popper; cigar holders, Casco Products Corp.

Plastics in Pictures



A Bakelite molded case for the Taylor Instrument Company's blood pressure tester known as the Sphygmomanometer.



The dixie cup replaces the good old stein as a beer quaffer, its main mission seeming to be that of sanitation. The Individual Drinking Cup Co. have constructed this Bier-Dixie cup to be used in conjunction with a handsome brown Bakelite molded container.

At last! And what a relief! An honest to goodness cap that stays put! The Anchor Cap and Closure Corp. has come to our rescue with the Anchor Turret Tube. It has a conical-shaped molded cap which turns but doesn't come off. The tube is eminently practical, supremely simple, and offers a measure of convenience for the user unknown heretofore. And they whisper that the company plans to make the caps of Durez.



Attractive and convenient rose-colored Durez refill jar, made for L. D. Caulk & Co., has added materially to the sales of their dental filling materials.





With the advent of modern plastic packaging, ideas and applications crowd rapidly upon one another. Here is one that promises to be revolutionary especially for gargling purposes. Mosby's A to Z Antiseptic is put into bottles carbonated under a pressure of several times atmospheric and tightly capped with a Durez valve-cap. User merely presses a button on top thereby releasing a small spray on the affected part.

Beetle Ware triumphant! A practical, good-looking tea service like this should find a ready market—witness the graceful lines of the sugar bowl, cream jug and tray molded for the premium use of Beetle Ware by the Northern Industrial Company, with an unusual choice from the ten standard Beetle colors.



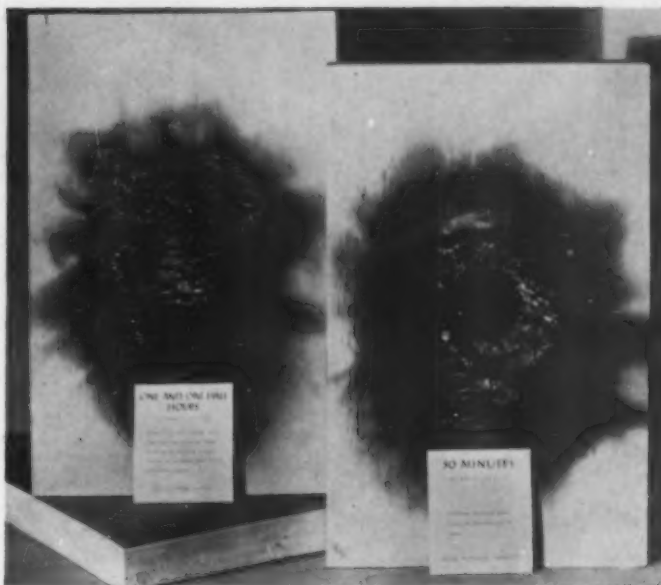
Bakelite enters the kitchen with an invention for saving absent-minded housewives many anxious moments! The saucy, yellow, Bakelite Molded chick perched on top of this highly polished copper double boiler emits an imperious whistle when the eggs have been boiled to a desired degree, thereby providing a scientific method of egg preparation. The boiler is manufactured by the Rome Manufacturing Co.



The attractive "Bonnyware" line of the Reynolds Spring Company includes: picture frames with Bakelite Molded Bases; flower vase with Bakelite Molded top; powder box; Bakelite Molded ash tray with metal inlay; flat cigarette box with molded top and bottom, and a set of small paper weights with molded bases.



Door panel on right veneered in usual way by using ordinary glues was completely destroyed in the center after 30 minutes' exposure to a gas torch. Panel on left has its face veneer backed up by a Durez-resin treated fire-resistant sheet, a Haskelite development, discussed elsewhere in this magazine, and the various plies are glued with Durez thermo-setting resin—100% waterproof, fire-resistant, and fungi-bacteria-proof.



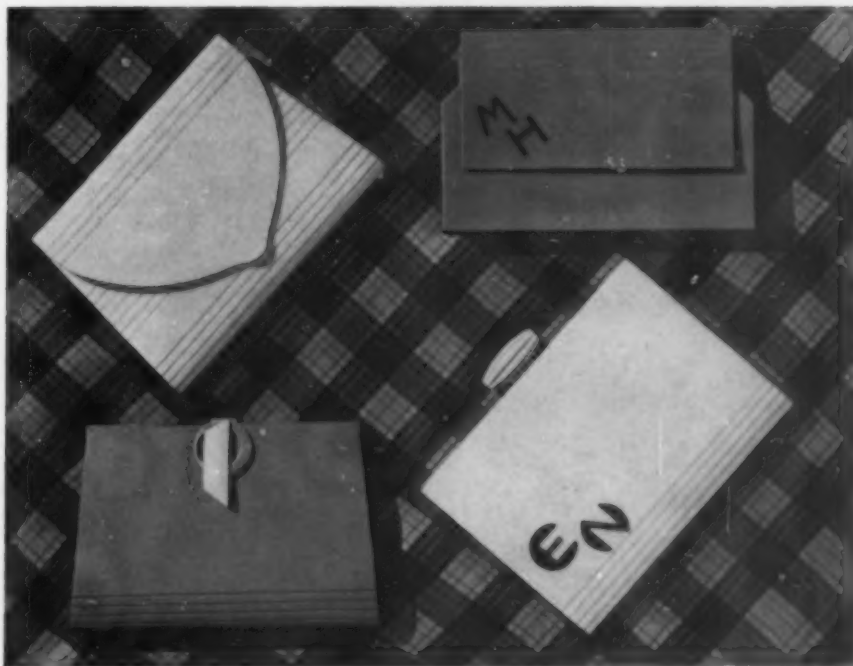
Want to sell more pen-and-pencil sets? Try this molded Durez desk-stand which offers the consumer a real incentive for buying your set. Designs and molds can be made to fit the needs of the pen-maker's market.



The Boonton Molding Co. comes to the fore with Durez Molded spouts and caps for oil dispenser spouts, bringing with them a host of advantages over the old metal spouts. They're easier to handle, are corrosion-proof, better to look at, and provide the only permanent identification a refiner can put on his bottles.



"Pyralin", a Du Pont plastic which has long served the industry appears in a new role—that of purses. The important features of these bags are their durability and the fact that they can be washed without in any way marring the appearance of the purse. The bags pictured are marketed by the Zyloware Corp.



Courtesy du Pont

New Plastic Packages



Courtesy Durez

A thin-walled, wide-mouthed, light-weight squattish plastic bowl, molded in many of the colors in which Durez comes, provides at once an ideal method for packing soap and things, and people have even recommended it for such products as tea, tobacco, caviar, shoe polish, etc.



A new method of getting your product right under the eyes of America is this combination coin tray and package display devised and patented by Clark Bros. Chewing Gum Co. Molded of General Plastics' Durez, a shiny black phenol composition, it is only one quarter as heavy as glass and holds a dozen gum packages.



Remember the picture of the man holding the comb with three hairs in it, admonished by the warning "Use Herpicide"? We now hear again of Herpicide aiding the barbers by providing a simple, economical method of instrument sterilization produced by Arthur Winarick, Inc. The base and covers on both jars are of Bakelite Molded.

Producers! Try to visualize your products on this rich and lustrous looking molded Durez display stand, then switch the vision to their appearance in 20,000 drug stores and, before you leave the trance, count up your increased sales. General Plastics, Inc. version of a practical drug-store stand.



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Special Purpose Lacquers*

With Particular Reference to Rubber Lacquers

By E. M. Hayden
Technical Director, Stanley Chemical Co.

OFTENTIMES one industry can utilize materials and processes of other industries which are in no way related. Lacquers find extensive use in fields which are most unrelated and it is hoped that by mentioning some of these uses some new ideas may be germinated.

Metal and wood industries are two of the largest consumers of nitrocellulose lacquers, and their demands have brought about the creation of many special purpose lacquers. The demands of the washing machine manufacturer for example have brought forth lacquers which will withstand the destructive action of household washing soaps when ordinary lacquers would discolor and come off under this ordeal. The makers of metal buttons have demanded and received lacquer finishes which will withstand the rough treatment of laundry solutions and pressing machines. Lacquers not especially formulated for this purpose would disappear on the first trip to the laundry.

An interesting application of lacquer from a decorative standpoint is its use on vanity and cigarette cases to replace vitreous or cloisonne enamel. These cases are sprayed with two or more coats of a hard, colored lacquer and after allowing to dry, the lacquer surface is buffed to a mirror-like finish. Decorations in many colors such as flowers are often put on these articles by spraying the colors through a series of stencils and the results of this stencil work are often difficult to distinguish from hand painting. When such designs are used, they are covered with a coat of clear lacquer before buffing. The advantages of a buffed lacquer finish over vitreous enamel are in speed of application and in elimination of high temperature baking. The lacquer finish will also withstand blows which would shatter the brittle vitreous enamel.

One of the oldest uses of lacquer on metal is that of transparent lacquer on polished metal surfaces to prevent tarnishing. In spite of the fact that clear lacquers have been used for this purpose for a great many years, there had been little improvement in these lacquers until a few years ago. The old lacquers would go to pieces in no time when exposed to the sun and elements, and much trouble was experienced on plated metals by the appearance of annoying spots. Recent developments have brought forth clear metal lacquers that will stand up out of doors and the old spotting trouble has been largely eliminated. The largest users of clear metal lacquers are the hardware and electrical fixture manufacturers.

A metal surface is generally smooth and the thin film produced by a lacquer of relatively low solid content is therefore entirely satisfactory. A wood surface requires a lacquer of high residual solid content to fill the roughness of the wood and thereby give a smooth finish. Also in the case of transparent wood lacquers a relatively thick film is necessary to give the appearance of depth to the finish. On the other hand, the metallic surface offers

many problems of adhesion and the lacquer must be compounded to take care of this, while the wood surface offers mechanical adhesion by the fibrous nature of its surface. While much wood lacquer is rubbed to a semi-dull finish, a large portion of it is produced by the use of a semi-dull lacquer. By incorporating materials such as aluminum or zinc stearate in a lacquer, such finishes without rubbing resemble closely the hand rubbed finishes. In addition to speed of application, wood lacquers offer the advantages of excellent durability and appearance, and incidentally one need never fear of sticking to a lacquered chair on a hot day as has happened often with a varnish finish.

The latest lacquer use which many laboratories are working on is the development of clear and colored lacquers which must be alcohol resistant for use on bars, trays and even beer mugs. Here are a few more examples of new lacquer uses. A good percentage of the fishline made in this country is coated or impregnated with flexible lacquers to waterproof and weight it. Fingernail polishes are transparent lacquers. A good portion of women's shoes made today have the soles cemented on with a clear lacquer which, besides making the process very rapid, eliminates nails and stitching. Fiber rugs are decorated with colored lacquers.

When lacquering rubber there are two very necessary modifications and these are flexibility and adhesion. Flexibility must be obtained with as little alteration to the film as possible and must be as permanent as possible. Plasticizers for nitrocellulose generally take the form of non-volatile liquids and it is quite natural to expect that they would lessen the tensile strength and tend to make the film sticky if used in excess. For many purposes where cheapness is more essential than other properties, pure castor oil is satisfactory. However, castor oil has one very undesirable property, that is of leaving or sweating out the lacquer film when subjected to heat. The film which remains will eventually become brittle and "boardy." As an example of this, if a waterproof coating of lacquer plasticized with pure castor oil were applied to cloth and the cloth subsequently made into curtains, these curtains would stiffen if hung for any length of time over a radiator or were washed a number of times in really hot water. In this case, the oil comes to the surface and can be rubbed off. In the case of lacquers for use on rubber, if castor oil is used as a plasticizer instead of coming to the surface it will in many cases soak into the rubber. This action in addition to making the lacquer film brittle, will cause over-softening or rotting of the rubber.

Fortunately there are a great many other plasticizers that can be used to make nitrocellulose flexible, many of which do not migrate from the film of lacquer. The worst shortcoming of the average plasticizer is that it causes over-softening of the film or to put it in another way, it causes the film to have very poor tensile strength. However, lacquers can be made which will give a good, dry, light resisting and tough film. These improved lacquers have already been applied to a great many types of fabrics

*Abstracted from paper read before American Ass'n Textile Chemists and Colorists.

and rubber coated articles and, doubtless, just as in the past few years there have been major improvements in this field, there will be further steps in the next few years to improve the finish still more.

The application of nitrocellulose lacquers to rubber surfaces is probably one of the most difficult with which the lacquer manufacturer has had to contend. It was early found that the composition, the type of cure and the type of finish of the rubber all played an important part in formulating a lacquer which would stick to that particular article made of rubber. In other words not only the general composition of the rubber itself but whether it was subjected to dry heat, ammonia, sulfur chloride, or some other type of cure, played a deciding part on whether the lacquer coating was satisfactory or not. All of these form a rubber surface which seems to have different reactions toward lacquer coating.

The treatment of the cured rubber surface has a definite effect on lacquers. In other words, the various types of materials used to dust the rubber, the matter of the use of water shellac, all have effects on the adhesion or non-adhesion of a lacquer film. In fact, we have seen lacquers, which adhered perfectly to a rubber coating of a definite composition, lose entirely their adhesion or durability by the change of only one or two items in the rubber formula. Some of the things which have great effect on the adhesion and durability of a lacquer film are the accelerators and anti-oxidants.

Nitrocellulose Finishes

The use of nitrocellulose lacquer on rubber is probably one of its few uses where rapid drying is not its most interesting property. To be sure, the rapid drying feature is often helpful in application, but it becomes secondary in many cases because often the lacquer is applied prior to vulcanization, and the baking action of vulcanization doubtless takes care of a slower drying material.

The nature of the finish obtained with lacquer on a rubber surface is its most interesting feature. This finish is drier and harder than can be obtained in any other way with the exception of bromine, and is of course without the hazard and uncertainty of a bromine finish.

In many cases rubber is made to look like leather, but no matter how close the appearance approaches leather, the surface will still feel rubbery and perhaps sticky. A coating of a proper lacquer will entirely remove the rubbery feel and give a dry, leathery feel. In addition a lacquer finish allows a wide range of gloss effects from a dull calfskin to a bright lizard shine. One other point in favor of lacquer coating on rubber is the fact that the lacquer coating protects the rubber, not only from the atmosphere, but from oil and grease.

There are two types of lacquer finish for rubber which are in use with equal satisfaction. One is the continuous film, the other the discontinuous film.

The continuous film variety must necessarily include all clear lacquers because any break in a clear lacquer film would be very noticeable. The continuous film lacquers are not quite as dry to touch as the other type because they are naturally more flexible. Some of the continuous film clear lacquers will stand an appreciable stretch without any noticeable break even under a microscope. They can be applied either before or after vulcanizing.

Discontinuous film lacquers are confined to pigmented lacquers and are designed to be used where an exceedingly dry surface is sought. They are usually applied before vulcanization and give a film which is cracked so finely that the cracks are scarcely visible. It is absolutely necessary that this type of lacquer have excellent adhesion because otherwise the fine cracks would be a starting place for peeling. The thickness of the lacquer coating is important. The best results seem to be secured with a thin film. This is particularly true of the discontinuous type of coating.

Where adhesion is of prime importance a lacquer designed to be applied before vulcanization will give the best results. In the

first place the uncured rubber surface gives the lacquer more of a chance to take hold than a cured surface. Also the baking obtained in the cure improves the bond greatly. Clear and colored lacquers change color sometimes when applied to rubber. This is particularly true of lacquer coatings applied before cure.

The high temperature of a dry heat cure will turn a clear lacquer yellow in color. Pigmented lacquers under the same treatment tend toward a yellowish cast while some pigments, as you know, will change color appreciably not only due to the temperature but also because of reaction with sulfur or some other ingredient of the rubber compound.

Disadvantage of Clear Lacquer

Clear lacquer applied after cure to rubber articles may discolor on age. This can usually be corrected by changing something in the compound. Recently we found in one article that reducing free sulfur to the minimum after vulcanization stopped the discoloration of this particular clear lacquer.

There are of course cases, such as in molded goods, where lacquer must be applied after vulcanization. In these cases it is quite often possible to increase adhesion by sacrificing a small amount of flexibility and many molded articles are being finished satisfactorily with lacquer. In some cases a lacquer applied to a molded article after cure can have the adhesion noticeably improved by giving the article a low temperature bake.

There is one place where to the best of our knowledge lacquers have failed to work, that is in attempting to lacquer before cure, and then curing by the ammonia process.

The application of lacquer to rubber surfaces follows the usual methods. For rubber coated cloth either the spreader, varnish knife, off-set roller or spray methods have been used successfully. For molded or formed articles such as balls, overshoes and electrical parts either spray or dip methods work well.

It might be well to mention a few rubber articles that are being lacquered successfully:—rubber coated cloth, rubber coated shoe lining, rubber overshoes, inflated and sponge rubber balls, golf balls, molded parts for electrical appliances, rubber dolls, rubber tile.

We may expect rapid strides in the coming years in the lacquering or finishing of rubber articles. There are many enamels now made containing no nitrocellulose, depending on a synthetic resin to do the duty of both the nitrocellulose and resin in the enamel. These are the so-called synthetic enamels. They have certain advantages and certain disadvantages over lacquer enamels.

Some of the advantages are lower cost per square foot of surface covered, cheaper solvents for thinning, and in certain cases marked resistance to certain alkalis and solvents.

The disadvantages to date are that they dry much slower than lacquer enamels, they lack real flexibility, and some types require baking in order to produce a hard, dry surface. However, we believe that eventually you will see synthetic finishes which will be used to finish flexible rubber articles.

Caoutchouc Lacquers

It has been discovered that in the vulcanization for producing caoutchouc lacquers instead of sulfur, suitable nitro-compounds may be used, e. g. symmetric trinitrobenzol, various trinitrophenols, etc. Well-known vulcanization accelerators can also be added.

These caoutchouc lacquers have a higher concentration than rubber varnishes vulcanized with sulfur and also have an agreeable odor. As dispersion media, both saturated as well as unsaturated hydrocarbons, further terpenes, and preferably mixtures of various hydrocarbons can be used. Especially good lacquers and varnishes are obtained, if polymerizable or polymerized vinyl or acrylic acid ester compounds, or similar substances are added to the caoutchouc, because thereby aging phenomena are prevented; while quality, hardness and solidity are varied or improved at will.

Pyroxylin

Plastics



for Wooden Heels

By T. D. L. Mabry
Director of Sales, Nixon Nitration Works

PYROXYLIN plastic sheet material under various trade names, has been used as a covering for wood heels for many years. In highly polished form it is so identical to patent leather in appearance that the ladies who have worn patent leather shoes have never known that the heel was covered with a different stock. For this use it has long been standard in the shoe industry.

But styles change. Patent leather rises and wanes in popularity and dozens of other types of material are always being utilized at the same time, thus limiting the field of pyroxylin.

Recent developments, however, have so greatly increased its uses that it has gained a new prominence in the trade. By means of an embossing process lately perfected it can now be used on practically all shoes whether made of kid or calf, silk or canvas or snake skin, in fact, it can be matched with any fabric or skin employed in the manufacture of ladies footwear.

One method makes use of large steel or copper embossing plates by means of which sixteen or twenty full size sheets, twenty inches wide by fifty inches long are embossed in one pressing. Another method provides small hand presses and plates with which the operator in the wood heel department of the shoe factory may emboss smaller areas with the different grains and effects as needed. Regardless of the method employed the graining must be permanent and must not "fade" in the subsequent softening operations incident to covering the heel. Overcoming of this "fading" presented the most serious obstacle to embossing pyroxylin and success was attained only after tedious and persistent experimentation, but the benefits derived both by the pyroxylin industry and the shoe manufacturers fully justified this work and expense.

A Broader Use

Another development broadening the use of pyroxylin sheet material for heel covers is a process of transferring to the sheet, by means of a decalcomania transfer film, a specific color pattern such as the distinctive and popular reptile effects. All types of snake, lizard, and frog skin can be beautifully reproduced. The transfer is made on one side of a clear transparent sheet and over it is sprayed a coat of special lacquer which forms a protective

Two of the heels in the picture illustrate two popular effects accomplished by the embossing method. The other demonstrates how pyroxylin may be made to simulate snake skin by means of the transfer process herein described. Courtesy Du Pont.

over-layer and at the same time provides the basic color required. In covering the heel this side is turned inward. Since the material is transparent the pattern appears to be on the surface, but the design is thus protected against scratching off. This development has been a boon to producers of high style shoes made of delicate fabrics as it gives them a tough durable material for that part of the shoe that receives the hardest treatment—the heel.

Another application of this same idea is employed to simulate the solid leather heel, that is one built up of "lifts" or layers of sole leather. The pyroxylin sheeting in this case is printed by means of transfer film with parallel bands of brown color of slight variation just as the different layers of leather might vary. By means of such a cover, a wood heel may be used in place of leather.

Covering Procedure

Covering a wood heel with pyroxylin material is easy and the equipment simple. From the sheets are cut pieces of proper size and shape known as "covers." A dozen or so of these "covers" are placed in a small pan of softening solution, generally a solvent diluted with water. About twenty minutes are required to reduce the "covers" to a soft elastic condition, the presence of water preventing them from becoming sticky. The operator now removes one cover, wipes it dry with two rapid swipes on a cloth pad and stretches it about the wood heel which is held in convenient position by means of a small jack or vice. Cement has been applied to the heel at the edge of the breast and this holds the material in place. It is now removed from the jack and the pyroxylin is folded over the top and heel seat surfaces and cemented down. Excess portions are trimmed off with scissors. This whole operation is performed by hand at the average rate of thirty-six pairs of heels per hour.

This material is not sold because it is cheaper which, in fact, it is not in all cases, but on its outstanding advantages. Its particular merit is that under ordinary circumstances it will not scratch or "scuff." The heel on the shoe of a modern active woman comes in for rough wear. Driving an automobile, walking on subway grates, stepping from concrete curbs, crowding in rush hours or shopping jams—these are some of the activities under which other material becomes torn or scratched, but pyroxylin, hard and tough, comes through the ordeal scatheless and when the shoe itself is worn out, ready for the discard, the heel is still in good condition.

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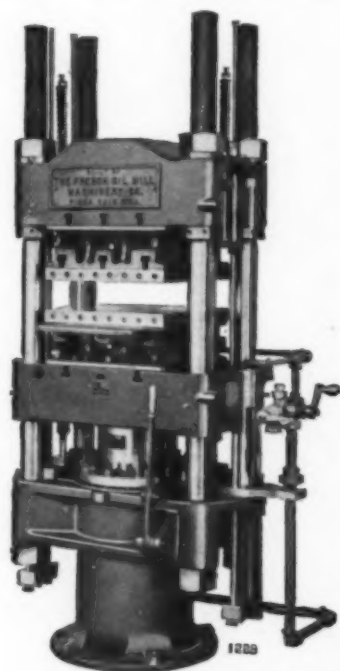
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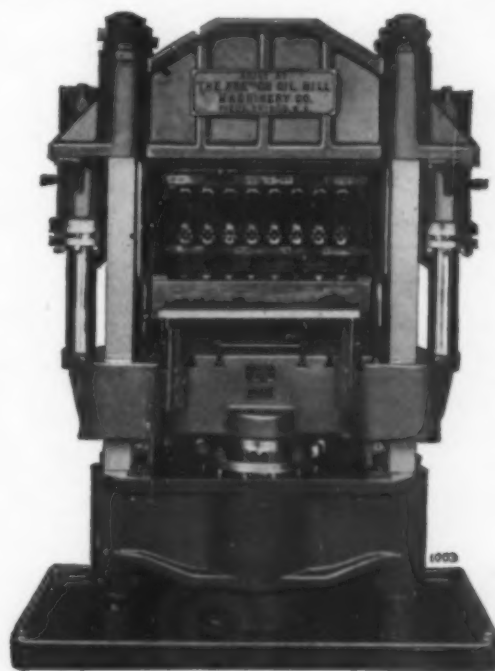
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Plastics in the News

Plans Being Laid For Permanent Lacquer Institute — Lacquer Statistics Reveal April Sales Improvement — Cyanamid Appoints Mackay Research Director — Commercial Solvents Acquires Rossville — Atlantic Pyroxylin Waste Explosion Kills 10 and Injures Over 200.

Plans for the forming of a permanent Lacquer Institute continued to occupy a large part of the attention of the industry's leaders in the past month. The temporary organization formed in May by 20 lacquer manufacturers has been further augmented by several important



Lacquer industry's representative at Washington meeting—Frank G. Breyer

producers, including Zapon, Maas & Waldstein and Fiberloid Corp. A meeting held in N. Y. City on June 28 and attended by a number of the strictly lacquer producers seemed to lend further proof of the desirability of forming the lacquer group as a separate unit, distinct from the paint group and similar to the group formed by the cold water paint people under the leadership of A. R. Dunning of the Muralo Corp. Present indications seem to point, according to leaders in the lacquer movement, to the vital necessity for the formulating of a code confined to the lacquer industry, and then possibly later cooperating in the drafting of a more inclusive general code for the entire paint, lacquer and varnish industries.

Washington Meeting

On July 6 the Lacquer Institute will be represented at a general meeting of the two paint associations in Washington by Frank G. Breyer of Singmaster & Breyer, where the entire situation will be thoroughly canvassed and it is expected further crystallization of ideas will take place. It is expected that after Mr. Breyer's

*See following page for quarterly summary of lacquer sales.

return final steps will then be taken to secure a permanent organization and to formulate a code to be presented at Washington.

Sales Improvement

Berry Bros. report that May shipments of lacquers, enamels, undercoat and other automobile body finishing materials, are 150% ahead of April this year and 50% greater than during May last year. May increase of 150% over April this year is made all the more impressive when compared with last year's reports, which gave May only slight increase over April. Berry Bros. lacquer and other aircraft finish shipments to airplane manufacturers during May were 25% ahead of April this year, and total for April and May, 1933, was 25% greater than for corresponding months of 1932.

Garret H. Demarest, 59, formerly connected with C. A. Wiley, Long Island City, for 25 years, a prominent Queens Mason, died June 6 at his home in Flushing, L. I.

Cleveland Club News

Cleveland Paint & Varnish Production Club officers who take charge this fall include: President, R. C. Starck, Pratt & Lambert; vice-president (re-elected), C.M.

Hayes, Ferber-Schorndorfer; secretary, (re-elected), E. Edelstein, Benjamin Moore; treasurer, Dr. C. G. Moore, Glidden. Women for the first time will be permitted on fall outing.

On June 2 Cleveland Paint Club played golf and elected following officers: Clifford Foss, president; vice-president, S. C. Wagenman; secretary and treasurer, N.W. Putnam. On June 30 golfers played Pine Ridge Country Club course.

Lacquered Beer Containers

American Can, it is reported, has booked business with Pabst, Budweiser and Schlitz for its new container for beer, and is getting ready to install special machinery. Container has highly polished, lacquer finish, and is reported to show savings up to 40% in freight rates, as compared with bottles.

British Notes

British Plastics Association has initiated a new drive to bring into the fold chemical manufacturers, manufacturers of cellulose, casein, resins, laminated material, molders, paints, varnish, and lacquers.

British Plastics Exhibition continues, it is reported from abroad, to draw large crowds.

British Plastics and Molded Products Trades has offered a cup to the Plastics Institute to be awarded annually to the Institute's best golfer.

Titanine, Inc., Union City, N. J. has been awarded following bids on lacquers for Army Air Corps, Wright Field: 5,400 gals. of clear cellulose lacquer, \$1.175; 1,800 gals. of olive drab cellulose lacquer, \$1.33; 2,000 gals. of yellow cellulose lac-

April Coating (Lacquers, Varnish, Paint) Sales*

Sales of lacquer, varnish and paint products in April totaled \$20,295,011 in value, according to a preliminary report by U. S. Bureau of Census (588 establishments) April sales were the best of any month since May last year, and compared with a revised total of \$14,431,360 in March, and \$22,612,193 in April, 1932.

	Total sales reported by 588 establishments	Classified sales reported by 344 establishments			Unclassified sales reported by 244 establishments	
		Industrial sales		Trade sales of paint varnish and lacquer	Total	
		Total	Paint and varnish			
1933—January	\$11,946,271	\$3,529,916	\$2,386,977	\$1,142,939	\$4,163,960	\$4,252,395
February	12,345,600	3,417,387	2,439,732	977,655	4,767,355	4,160,858
March*	14,431,360	3,384,766	2,477,369	907,397	5,794,823	5,251,771
April†	20,295,011	4,664,267	3,130,761	1,533,506	8,633,276	6,997,468
1932—January	15,894,506					
February	16,270,822					
March	19,089,005					
April	22,612,193					
May	24,981,441					
June	19,637,358	4,685,399	3,617,719	1,067,680	8,734,330	6,217,629
July	14,430,122	3,793,245	2,900,707	892,538	6,058,813	4,578,064
August	16,032,441	3,851,028	3,057,096	793,932	6,918,659	5,262,754
September	16,805,712	3,980,564	3,113,303	867,261	7,216,748	5,608,400
October	15,592,377	3,996,500	3,036,323	960,177	6,610,011	4,985,866
November	13,260,328	3,599,319	2,639,362	959,957	5,196,766	4,464,243
December	10,127,780	3,222,770	2,186,706	1,036,064	3,506,715	3,398,295
Tot., year	\$204,734,085					
1931—Total	278,442,170					

*Revised. †Preliminary.

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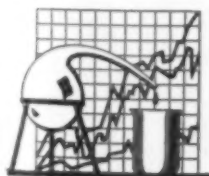
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—for the Plastics Industry

*Cellulose Plastics ::
:: Synthetic Resins*



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NEW STOKES ROTARY PREFORM PRESS "DDS-2"



It has what you want in a
PREFORM PRESS

Speed

350 preforms per minute.

Versatility

Pieces up to 1" thick; die fill up to 2"; hand wheel weight and pressure adjustments; possibility of operation with as many pairs of punches of one type as job warrants.

Quick "change-over"

Punches lifted out; dies easily changed.

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Excess Pressure Release, with spring control, spills overloads and absorbs strains.

Accuracy in Weight

Die cavity overfilled, excess scraped off before compressing.

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Slow squeeze from both sides simultaneously instead of sudden blow.

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Dust collectors prevent part wear and loss of material.

Other Features:—Makes ball-shaped preforms; model for cored pieces available. Easily motor driven . . . Silent . . . Heavier . . . More Compact. Moving parts housed, yet accessible . . . Rugged . . . Large Bearings. V-Belt driven, if desired. Alemite lubricated.

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FJSTOKES MACHINE COMPANY

Process Equipment Since 1895

5934 Tabor Road

Olney P. O.

Philadelphia, Pa.

quer, \$1.39; 1,400 quarts of red cellulose lacquer, 41.5c. a quart; 1,800 quarts of white cellulose lacquer, 37.5c. a quart; 1,400 quarts of dark blue cellulose lacquer, 39.5c.; less 1% for all; 1% discount.

	Gallons	
	1931	1932
Pigmented nitrocellulose lacquers	332,951	225,546
Clear nitrocellulose lacquers	94,339	78,596
Thinners for nitrocellulose lacquers	305,295	205,427
Varnishes (oil, spirit and liquid dryers)	377,430	292,922

Change of Ownership

Jos. H. Meyer Bros. who formerly marketed their pearl essence under the trade-mark "Richelieu" have disposed of that phase of their business to The Mearl Corp. who will use the trade-mark "Mearlmaid." Associated in the new company are, Francis Earle, former president of The Oxalite Corp. and Harry Mattin, former treasurer and chemical director of Jos. H. Meyer Bros. New company, in addition to operating its plants at Reedville, Va., and Eastport, Maine, will open an additional one in the vicinity of Newark, N. J., and an office and laboratory in N. Y. City. Until suitable quarters are found new company has engaged temporary space at 220-25 st., Brooklyn, N. Y.

Hydrowax—New Glyco Product

Hydrowax, produced by Glyco Products, Brooklyn, is now being used to coat rubber, giving it is said a glossy shiny surface, less likelihood of "sun-cracking." It reduces sticking of sheet goods, soiling and surface decomposition. Also surface pores are sealed. It is also used on leather, artificial leather, cement, or composition products of a porous nature.

Zapon's New Finish

Tremendous popularity of suede and suede-like materials has led to development of a revolutionary new finish by Zapon, a subsidiary of Atlas Powder. It is known as Sprayed Izarine Finish. Formerly the covering of any article with suede or imitation suede meant cutting and pasting innumerable pieces and then laboriously mounting them. Now a suede-like finish can be given to any surface by merely spraying a unique enamel and an equally unique Izarine powder with an air gun.

Process, which is completely covered by patent applications, is simple, but research covering many years was necessary before it was perfected. Problem was to formulate an enamel that would remain wet long enough to leave time for the spraying on of the Izarine Powder and yet dry rapidly thereafter without the need of baking or other artificial forcing.

Export Data

U. S. exports of lacquers and varnishes in 1932 were considerably lessened from the gallonage of the preceding year, according to Dept. of Commerce records. Comparison of exports for 1932 and 1931 follows:—

Personnel

Cyanamid has appointed G. M. J. Mackay, Director of Research for companies in the Cyanamid group. His headquarters will be in the general offices, 535 5th ave., N. Y. City.



Cyanamid picks a new Director of Research—G. M. J. Mackay, formerly of G. E.

Mr. Mackay is a graduate of Dalhousie University, Halifax, N. S., where he specialized in chemistry and physics. His graduate work was done in physical chemistry at M. I. T. under Dr. A. A. Noyes. Mr. Mackay was appointed research assistant to Dr. Irving Langmuir in 1910, and was in charge of research and development work in the Insulation Section of G. E. Laboratories.

J. F. Walsh, formerly with Celluloid, and for the past five years with Arthur D. Little, Inc., has joined American Maize Products, and will make his headquarters at company's plant at Roby, Ind.

Schaefer Names Cunningham

Schaefer Co., Louisville varnish and lacquer company, has appointed Todd Cunningham, Ft. Smith, Ark., representative in Southwest to fill vacancy caused by death of Toney Carter. New sales representation for the South will also be named shortly.

Obituaries

Charles E. Wheeler, 86, president and treasurer, Standard Machinery Co., Mystic, Conn., died at his home in Mystic on June 28. Mr. Wheeler was well known throughout the plastic trade. His firm is one of the leading manufacturers of pre-forming equipment. He is survived by two sons, Morton C., and John R. Wheeler, a wife and daughter. Both of his sons are actively interested in the business which will undoubtedly be continued under their guidance.

George G. Roberts, 68, reputed inventor of non-shatterable glass, died in Washington recently.

C. I. Kelly lectured May 31 before London Oil & Chemists' Association on "Petroleum as a Source of Paint Materials," referring particularly to the petroleum resins.

Process for production of these resins consists of the treatment of vapor-phase cracked spirit, highly unsaturated, with catalysts (aluminum chloride). Two polymers, one insoluble and the other soluble in the unaffected hydrocarbons are obtained. After separation of insoluble variety, soluble polymer is recovered by vacuum distillation and is marketed as "petroleum 200 resin." It is amber colored and melts at 230° to 240° F. It is soluble in practically all hydrocarbon solvents, but is insoluble in methanol,

Quarterly Lacquer Statistics (Jan.-Mch.)

Sales of lacquers during first quarter of 1933 were 3,866,821 gals. against 3,532,718 gals. in final three months of 1932, according to preliminary figures compiled by the Bureau of Census, (102 identical manufacturers). Sales in first quarter of 1932 were 4,666,420 gals.

	Total sales		Finished lacquer		Lacquer thinners		Dopes*	
	Gals.	Value	Gals.	Value	Gals.	Value	Gals.	Value
1933								
First quarter†	3,866,821	\$5,291,498	1,870,199	\$3,629,898	1,772,274	\$1,408,524	224,348	\$253,076
1932								
First quarter†	4,666,420	6,947,508	2,249,069	4,692,055	2,161,317	1,913,937	256,034	341,516
Second quarter†	4,475,293	6,867,544	2,337,612	4,823,513	1,968,189	1,796,301	169,492	247,730
Third quarter†	3,578,390	5,382,948	1,778,305	3,593,977	1,601,875	1,515,330	198,210	273,641
Fourth quarter†	3,532,718	5,140,226	1,836,432	3,524,739	1,499,002	1,341,175	197,284	274,312
Totals, year.	16,252,821	24,338,226	8,201,418	16,634,284	7,230,383	6,566,743	821,020	1,137,199
1931								
First quarter†	5,622,337	9,504,887	2,835,390	6,524,744	2,565,008	2,602,506	221,939	377,637
Second quarter	6,712,289	10,966,421	3,265,744	7,399,231	3,153,427	3,038,561	293,118	528,629
Third quarter.	5,515,026	8,641,603	2,727,951	5,791,264	2,521,764	2,456,265	265,311	394,074
Fourth quarter.	4,586,663	7,223,112	2,352,524	5,012,044	2,030,906	1,902,364	203,233	308,704
Totals, year.	22,436,315	36,336,023	11,181,609	24,727,283	10,271,105	9,999,696	983,601	1,609,044

*Does not include base solutions used in the manufacture of lacquers.

†Revised.

‡Preliminary.

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Made in Beautifully Mottled
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Established 1881

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Steel Steam Platens

Die Presses and Dies

This mixer constructed
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portant features
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Complete line of machinery
for
Celluloid & Plastic Mfrs.

Special Representative

Evarts G. Loomis
126 So. 14th St.
Newark, N. J.

ethyl alcohol and acetone. In addition to this hard resin, plastic resins are available and may prove useful to paint manufacturers.

J. Paul Nolan, Pratt & Lambert purchasing agent, elected vice-president, National Association of Purchasing Agents, in charge of Eighth District.

Solvents

Com'l Solvents Buys Rossville

Commercial Solvents has entered into an agreement to purchase from Rossville Alcohol latter's industrial alcohol business, New Orleans plant, plant of the California subsidiary, and certain current and working assets of the corporation and its subsidiaries, including inventories. Consideration to be paid by Commercial Solvents to Rossville is 105,000 shares of Commercial Solvents stock and cash in the amount of the book value of the current and working assets to be sold.

Agreement is outlined in a letter which has been sent to Rossville stockholders by H. I. Pepper, chairman of the board of Rossville. Assets of Rossville and its subsidiaries not covered by the agreement with Commercial Solvents comprise principally cash, notes and accounts receivable and plants at Lawrenceburg, Ind., and at Carnegie, Ohio, and certain other facilities which may be adaptable to the manufacture and sale of alcoholic beverages.

It was pointed out that the proposed sale of assets of Commercial Solvents requires approval by holders of a majority of the preferred stock and common stock of Rossville, for which a special meeting of stockholders has been called for July 18.

It is understood holders of a majority of the common stock of Rossville have indicated they will vote in favor of the proposed sale if, and only if, the holders of substantially all of the preferred stock will presently consent to accept on any further distribution of the assets of the corporation, \$10 in cash and one-half share of Commercial Solvents stock per share of preferred stock, in lieu of the stated distributive value of the preferred stock.

Commercial Solvents Corp. has outstanding 2,530,255 common shares of an authorized issue of 3,000,000 shares. On Dec. 31, 1932, company held 37,725 shares of common stock in its treasury.

John H. Flynn, brother of the N. Y. Secretary of State, has been appointed temporary supervisor of permits of the Industrial Alcohol Bureau for the N. Y. district. W. B. Moss is transferred to Cincinnati.

Sharples' New Booklet

Sharples Solvents, 23rd & Westmoreland sts., Philadelphia, has just issued a comprehensive booklet giving detailed chemical and physical properties of their interesting list of chemicals derived from the pentanes, as well as uses, size of containers, etc. A number of these products are of direct interest and application in the plastics field.

New Solvents and Plasticizers

Howards & Sons, Ltd., Ilford, London, England, have added several new or improved solvents and plasticizers to their list that are of interest in this country.

Recent additions are a diacetone alcohol of greatly improved stability generally and a much higher flashpoint, and two new plasticizers, Barkite B. (dimethylcyclohexanol oxalate) and Sextol stearate (methylcyclohexanol stearate). Barkite B. is a plasticizer for the cellulose and synthetic resin lacquer and film industries principally; it possesses outstanding resistance to light and ultra-violet radiation, and its solvent powers for nitrocellulose and resins are far in excess of those of almost any other plasticizer on the market, while it is also considerably lower in price, according to the company's booklet. Barkite B., like Barkite, has found considerable application in the varnish trade for preventing "wrinkling" in wood-oil varnish films, "bloom" in wood oil and other finishes, and "skinning" in varnishes.

Sextol stearate is a plasticizer combining the properties of exceptionally low volatility, minimum of odor and color, and good stability; and the price is as low as that of Barkite B. Its chief uses in lacquers are to increase gloss and water-resistance, and also in those cases where a high degree of plasticity is required in the lacquer and where oils are undesirable. It is used in conjunction with other plasticizers. For the reasons given above it is a useful constituent of cellulose leather finishes. Another use of sextol stearate, which is steadily growing, is as a mold lubricant in molding compositions, particularly those of the bakelite and shellac types.

Laminated

Haskelite Manufacturing Corp. reports for 1932 net loss after depreciation and other charges of \$110,709, compared with \$28,853 loss the year before.

G. E.'s New Leaflet

G. E. has just released GEA-1746 leaflet describing Glyptal-Cloth insulated cable. Copies available by writing company's Schenectady headquarters.

Molded

June meeting of the N. Y. City Molders' Representatives was held June 29 at the Machinery Club, with Boonton Moldings, C. J. Groos, presiding. After the luncheon Williams Haynes, publisher of *PLASTIC PRODUCTS AND CHEMICAL MARKETS*, spoke on the Industrial Recovery Act and outlined what steps the various divisions of the chemical and allied industries are taking to comply with the provisions of the Act. He stressed particularly the work done so far in the formation of the Lacquer Institute and the steps being taken in determining the sentiment for a "Plastics Institute."

Bakelite's Heat Resistant Material

Bakelite has released news of its new heat resistant material about which many rumors have been existant in the trade for several months. Material resists high temperatures and at the same time retains its original lustrous surface. It is reported that ash trays have been subjected to all sorts of abuse and without any apparent affect. Steel ball bearings were placed in ash trays and allowed to rotate until they were cool; lighted matches, cigarettes and cigars were allowed to burn in the tray without any charred area, or dulling of the surface appearing. New product opens up a number of new and interesting possibilities besides ash trays. Heater plugs, cooking utensil handles and smoker's pipes are two suggestions now made by the Bakelite Corp.

I. G. Introduces

I. G. Farbenindustries is reported to have started production of plastic products from mixtures of chlorinated naphthalenes, china clay, french chalk, cryolite, and powdered aluminum. The resulting material is said to resemble porcelain in appearance.

Coldwater Plastic, recently organized, has acquired plant at Coldwater, Mich., and will begin manufacture of small products.

Dr. John F. Stearn is scheduled to give a paper "Properties of Plaskon of Rheologic Interest" at the December meeting of the Society of Rheology in Pittsburgh.

The Drug and Cosmetic Industry for June contains an interesting article "Grace and Charm in Plastic Packages."

Molding business is getting better, R. E. Dodd of General Plastics (Durez) reports.

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for the manufacture of

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CASEIN

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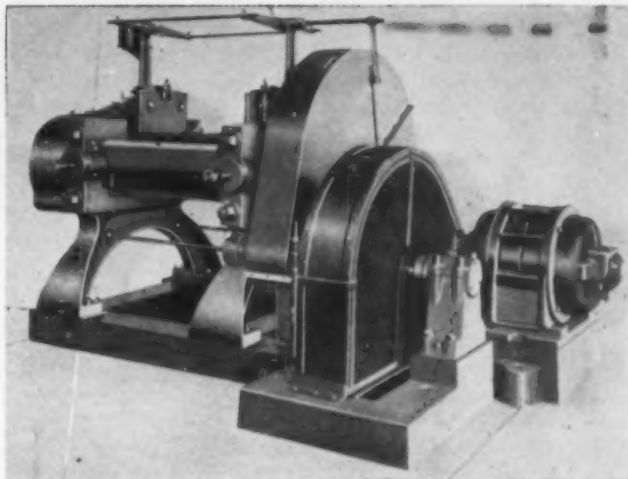
KAY-FRIES CHEMICALS INC.

(Manufacturers of Organic Chemicals)
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16 x 42

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 Durez, Bakelite, Asphalts and
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 machines.**

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WM. R. THROPP & SONS Co.

TRENTON, N. J.

Established 1888

Advance Offers Resin K. M.

Advance Solvents & Chemical, N. Y. City, is marketing synthetic resin, Resin K. M.

It is free from phenols and aldehydes, and has the following specifications:

Softening point: 115-125° C. Acid number: Below 28. Soluble in: aromatic benzene, hydrocarbons, turpentine, most of the esters, linseed oil, China wood oil, petroleum naphtha. Insoluble in: lower aliphatic alcohols.

It is not comparable with other oil soluble synthetic resins on the market. It has the following special advantages: 1. Permanent pale color; 2. Very good fastness to light; 3. Exceptional compatibility with drying oils; 4. Good rate of drying of varnishes made with it.; 5. Only the slightest tendency to yellowing on baking white and pale tinted enamels, even at temperatures as high as 90-100°C (194-212° F). 6. High resistance to climatic conditions; 7. Economy, as large proportions of linseed oil can be used with it. Additional data are available from the company.

Advance is also marketing under the trade-name "Mowalith" a series of water-white polymerization products of vinyl acetate. There are three grades, designed as H, N, and NN, the difference being in viscosities of equal concentrations of 20% benzol solution, measured according to Cochiu at 20° C. H about 52 seconds, N 18, and NN, nine.

Industrial Technical Research Institute, Sydney, Australia, has recently taken out patents on the manufacture of tubes from synthetic resins that can, it is said, be used for the distribution of water, gas, etc.

General Plastics (Durez) for July, in addition to telling of the latest applications of Durez, tells the story of Designer Helen Dryden, famed industrially for her many artistic adoptions of plastic and other decorative materials.

Edwin H. Scheele, artist, designer, consultant, formerly president of Package Design Corp., is now rendering the same service at 419 4th ave., N. Y. City, under his own name.

Cellulose

Various theories have been advanced in investigation of the explosion at the plant of the Atlantic Pyroxilin Waste Co., 316 River Road, North Arlington, N. J., on the evening of June 10, none of which appear to be entirely satisfactory. Ten people were killed by the blast and over 200 injured. The explosion took place at

nine p. m. and most of those injured were bathing in the nearby Passaic River.

Alexander Scheinzeit, owner of the plant, was questioned for several hours immediately following the catastrophe, and was finally held on a technical charge of manslaughter. Later, Larry and Herman Gering, operating a cellulose reclaiming plant in Newark, were interrogated and then released in their own recognizance. Tony Donelescara, chauffeur for Scheinzeit, is said to have told investigators of several instances of keen rivalry between cellulose waste producers. While the police seemed to lean to incendiaryism as the cause, the State Dept. of Labor investigators were of the opinion that not enough space was left between the stock and the roof and the intense heat was responsible for combustion.

Assistant Prosecutor Charles Schmidt and the Bergen County Grand Jury later visited the scene and a full investigation has been promised.

Celluloid Products Division, Hercules Powder, received special mention by the National Safety Council for having the most man-hours without disabling injury in middle-sized units, and largest to make consistent improvement in both injury rates since 1930 and for attaining perfect record for 1932.

J. L. Maney, formerly with du Pont central control station, Old Hickory, Tenn., has been transferred to Cellophane division.

A new non-shatterable glass producer has started production in Lausitz, Germany.

Artificial Leather—Brown Co.

A patent recently assigned to Brown Co. of Berlin, N. H., for manufacture of artificial leather. Patent consists of use of sheet material, comprising a porous foundation of loosely felted cellulose fiber, pores of which contain rubber and bake-

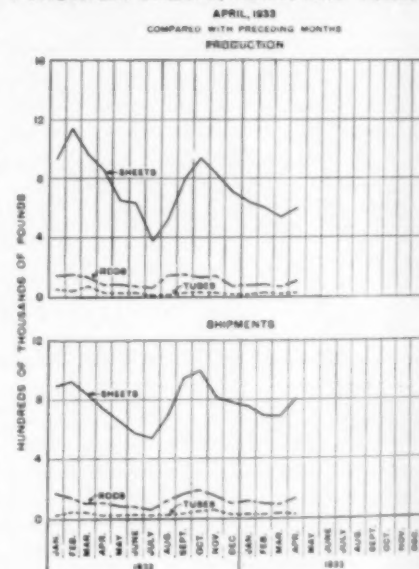
lite varnish; and a process which comprises impregnating a porous foundation of interfelted cellulose fiber with an aqueous dispersion of rubber, drying said foundation, impregnating with a solution of bakelite varnish, removing the solvent, and curing at elevated temperature.

New Pyralin Use

A further application of Pyralin (duPont) as a safety measure has been developed in a hood for use over a press designed to produce small porcelain parts, such as are used in the manufacture of electrical equipment. Material used in the machine is in powder form and usually the places in which these presses operate are filled with porcelain dust. This dust is detrimental to machinery on account of its abrasive action, and, therefore, has to be kept away from bearings and sliding surfaces of machinery.

Use of Pyralin has an added advantage in that the material, being transparent, enables operators to ascertain the cause of any disturbance or irregularity in the machinery.

PYROXYLIN SHEETS, RODS, AND TUBES



PYROXYLIN SHEETS, RODS, AND TUBES

Bureau of the Census presents in the following table monthly statistics on production and shipments of pyroxilin sheets, rods, and tubes, based on data furnished by nine identical establishments.

Production and Shipments in Pounds

Year and Month	Sheets		Rods		Tubes	
	Production	Shipments	Production	Shipments	Production	Shipments
1932						
January	931,485	890,221	145,145	171,619	56,828	23,431
February	1,148,592	928,066	159,290	144,530	43,509	44,030
March	968,977	845,550	132,430	101,513	69,352	43,739
April	851,145	743,698	80,863	104,662	29,723	24,070
May	659,028	664,585	85,879	84,635	22,795	20,771
June	630,384	572,958	78,792	80,212	25,915	22,150
July	389,115	540,874	64,662	68,818	11,875	20,279
August	539,953	691,390	141,608	125,891	13,735	25,227
September	801,870	941,051	155,423	163,442	29,080	32,703
October	940,231	1,007,355	134,980	187,597	33,175	46,988
November	838,967	818,125	143,731	154,435	25,709	52,410
December	712,601	787,121	71,696	104,729	17,720	26,743
Total (Year)	9,412,348	9,430,994	1,394,499	1,492,083	379,416	382,541
1933						
January	635,078	752,832	75,707	119,098	14,070	29,369
February	597,121	687,672	80,828	101,903	23,092	25,741
March*	535,271	687,474	65,422	90,579	17,582	32,583
April*	593,584	803,891	105,423	131,634	26,200	27,095

*One firm not reporting.

The New 1933

Chemical Guide-Book

Page From New 1933 Chemical Guide-Book

Contains—

ACETONE (Continued)

fuels, lubricating compositions, rayon, rubber cements, horn substitutes, photographic films and plates, cellulose acetate plastics, celluloid, pyroxylin plastics; as solvent; solvent for starches, dextrans, smokeless pwr., cordite, gum, petroleum products, making artificial leather, artificial perfumes, asphalt, bitumens, acetate dopes and varnishes, bituminous paints, nitro-cellulose lacquers, synth. and natural waxes and resins, purifying paraffin and rubber; denaturant for industrial alcohol; extracting medium; extracting fats and oils; disinfectant; cleansing agent; storing acetylene; treating hides; dyeing cotton with aniline black; degreasing wool; degumming silk; in medicine. Grades—U.S.P.; C.P.; tech. Cont.—tank cars (\$3,000 lbs.); tins; bbls. (350 lbs.); drums (33, 70, 350, 445, 650, 700 lbs.); cans (9 lbs.); bottles (34, 1, 5 lbs.). Ship. reg. red label. Tariff, 20%.

*Baker Chem Co, J T, N Broad st, Phillipsburg, N J Phillipsburg 5-2151
Chemical Solvents, Inc, 110 E 42nd st, N Y Caledonia 5-4623
City Chemical Co, 23 W 24th st, N Y Watkins 9-2723
*Doe & Ingalls, 198 Milk st, Boston, Mass Hancock 8540
Good, Inc, Jas, 2111 E Susquehanna av, Philadelphia Regent 9697
Gray & Co, Wm S, 342 Madison av, N Y Vanderbilt 3-0500
*Groff & Co, R W, 10 E 40th st, N Y Ashland 4-5765
*Howe & French, 99-101 Broad st, Boston, Mass Hancock 5910
Kessler Chemical Co, 405 Lexington av, N Y Vanderbilt 3-7390
Lewis & Co, Inc, Chas H, 228 Canal st, N Y Canal 6-7573
*Mallinckrodt Chem Wks, 2nd & Mallinckrodt sts, St Louis Tyler 0770
*Morek & Co, Lincoln Ave, Rahway, N J Rahway 7-1200
Morgan, Inc, Clarence, 919 N Michigan av, Chicago, Ill Superior 2462
Rogers & McClellan, 1-1 Milk st, Boston, Mass Liberty 0995
Rosenthal Co, Inc, H H, 25 E 26th st, N Y Caledonia 5-6540
Wishnick-Tumppner, Inc, 251 Front st, N Y Beekman 3-6732

Barada & Page, Kansas City, Mo
Barber Co, W H, Minneapolis
Barlow, Joe, Dallas, Texas
Braun Corp, Los Angeles
Braun-Knecht-Heimann Co, San Francisco
Butcher & Co, L H, Los Angeles
Calvert Anil & Chem Co, Cincinnati
Capen & Lane Co, Brockton, Mass
Carbide & Carbon Chem Co, N Y
Carpenter-Morton Co, Boston
Cleveland-Cliffs Iron Co, Cleveland
Commercial Solvents Corp, N Y
Cooper & Co, Chas, N Y
Delta Chem & Iron Co, Wells, Mich
DeMert & Dougherty, Chicago
Drackett Chem Co, Cincinnati
Eaton-Clark Co, Detroit
Globe Chem Co, Cincinnati
Herbert Chem Co, St Bernard, Ohio
Hill Bros Chem Co, Los Angeles
Hood Chem Co, Abner, Kansas City
Judson Co, Dwight R, Hartford, Conn
Keery Co, Thos Hancock, N Y
Kerr Co, Frank W, Detroit

Keystone Anil & Chem Co, Chicago
Mailliard & Schmiedell, San Francisco
Masco Chemical Co, Brooklyn N Y
McCleary Bros, Inc, Memphis
McKesson, Churchill Drug Co, Burlington, Iowa
Mefford Chemical Co, Los Angeles
Merchants Chem Co, Chicago
Michigan Iron & Chem Co, Chicago
Miller & Co, Carl F, Seattle, Wash
N Y Quinine & Chem Wks, Brooklyn, N Y
Norwich Chem Mfg Co, E Smethport, Pa
Pierce & Stevens, Inc, Buffalo
Read & Co, Chas L, N Y
Rex Chemical Co, N Y
Robins & Co, G S, St Louis
Scobell Chemical Co, Inc, Rochester
Union Solvents Corp, N Y
U S Industrial Alcohol Co, N Y
West Co, H T, Boston
Western Mch Co, Wichita, Kan
Western Scientific Supply Co, Denver

ACETONE ALCOHOL, see Methanol

ACETONE OIL

Slightly colored, oily liq., penetrating odor. Sp. gr. 0.812-0.865. B.P. 75°-125°C. (according to composition). Uses—alcohol denaturant; solvent; purifying dyes; cellulose esters, and ethers solvent; celluloid solvent. Grades—light; heavy. Cont.—drums (55, 110 gal.); tank cars (8,000 gal.). Tariff, 20%.

*Doe & Ingalls, Inc, 198 Milk st, Boston, Mass Hancock 8540
Ferguson Co, Alex C, 20 Oregon av, Philadelphia, Pa Oregon 8107
*Howe & French, 99-101 Broad st, Boston, Mass Hancock 5910
Morgan, Inc, Clarence, 919 N Michigan av, Chicago, Ill Superior 2462
Cleveland-Cliffs Iron Co, Cleveland Delta Chem & Iron Co, Wells, Mich

ACETOPHENONE (Phenylmethylketone, Benzoyl Hydride, Acetyl Benzene Hypnone)

C₆H₅O. Colorless liq. or transparent cryst. Sp. gr. 1.02825. M.P. 205°C. B.P. 202°C. Insol. water; sol. alcohol, ether, chloroform, oils. Uses—mfr. perfumes, pharmaceuticals, organic chemicals; in medicine. Cont.—tins, bottles (34, 1, 5 lbs.).

*American-British Chem Supplies, 180 Madison av, N Y Ashland 4-2265
*du Pont de Nemours & Co, E I, Wilmington, Del Wilmington 5121
*Kay-Fries Chemicals, Inc, 180 Madison av Ashland 4-2265

* For full list products of these firms, see Part I.

(44)

When writing, please mention

(full size)

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Use of partially hydrolyzed cellulose acetates for manufacture of plastic masses, lacquers, etc., as well as threads, bands, films. No. 1,911,657. S. I. Vles, Holland, to Algemeene Kunstzijde Unie, Arnhem.

Process for new cellulose butyric esters, soluble in methyl alcohol. No. 1,912,189. Gault and Angla to Soc. des Usines Chimiques Rhone-Poulenc.

Acetylating of cellulose by hydrochloric acid with zinc chloride and H₂SO₄ as catalysts. No. 1,912,275. H. O. Hertlein to I. G. F., Germany.

Cellulose acetate compositions containing dibenzyl aniline. No. 1,912,718. F. T. Murray, Jr., and C. J. Staud, Rochester.

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Formaldehyde

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Phenol and Resins

Plastic phenolic resin of the heat-hardening type. No. 1,911,477. L. Sontag to General Plastics, Inc.

New sulphurized phenol, with water soluble tin compound as reagent. No. 1,911,709. F. Muth to I. G. F., Germany.

Process for making moldable synthetic resins of the phenol-formaldehyde type from tar acid-containing distillates. No. 1,911,745. Burke and Bhagwat to Combustion Utilities Corporation, N. Y.

Purification of dihydric phenols by distillation with certain organic solvents. No. 1,912,628. N. Elliott to Dow Chemical Company.

Resin of tar condensation product from hard-wood distillation, solid & insoluble in all but solvent naphtha. No. 1,911,489. Carlin & Hochwalt to Tennessee Products Corporation, Nashville.

Coatings

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Method of coating and resulting product, with single drying operation to permit sanding and top-coating. No. 1,912,372. J. and Keats to duPont.

Nitrocellulose coating composition. No. 1,913,679. B. N. Lougovoy to Ellis-Foster Company, Montclair, N. J.

Process for preparing colored lacquers utilizing basic dyestuffs—inorganic acid components. No. 1,912,421. B. Zschimmer to I. G. F., Germany.

Laminated

Changes in pressure in marginal portions (glass) and method of superimposing composite sheets. No. 1,911,296. G. B. Watkins to Libbey-Owens-Ford.

Silent gears, and method, with layers resin-impregnated to harden under heat. Nos. 1,912,082-3. R. W. Lytle to Formica Insulation Co., Cincinnati.

Impregnated composition trays, hardened under heat and 2-direction pressure. No. 1,912,931. N. S. Clay to Westinghouse Electric Mfg. Co.

Veneered door et al, on wood core with compressible fibrous layers treated with phenol condensation product. No. 1,911,374. E. C. Loetscher, Dubuque, Iowa.

Interposed non-brittle membrane between gelatine and nitro-cellulose mixtures on glass sheets. No. 1,913,223. G. B. Watkins to Libbey-Owens-Ford Glass Co.

Machinery

Metal mold for molding objects from plastic materials. No. 1,911,539. O. Walter, Indiana.

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Apparatus with extended conduit for the digestion of fluent nitrocellulose. No. 1,911,201. M. G. Milliken to Hercules Powder Co., Delaware.

Miscellaneous

Process for the manufacture of decorated sheets of plastic materials. No. 1,912,401. J. A. Renouprez, France, to duPont Company.

Plastic glass substitute for displaying perishable specimens. No. 1,912,554. J. F. Walsh to Celluloid Corporation.

Process by acetylene for preparation of vinyl esters. No. 1,912,608. W. Weibezahn to I. G. F., Germany.

Molded electrical condenser. No. 1,913,473. R. A. Brennecke, Evanston, Ill.

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Colored urea ware with intaglio decorations by hot die process. No. 1,914,247. Edmund Froese, Brooklyn.

Composition moldable into hard, tough structural material, from bulk of cumarone resin. No. 1,913,244. Felix Reimann, Germany.

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And Now, in Closing:—

The tragic fire, early last month, that destroyed a New Jersey pyroxylin scrap concern and cost the lives of eleven people is the fourth fire of such nature that has occurred in that State in recent years. Witnesses have told of the explosions which marked this most recent case, and newspaper readers immediately blame the pyroxylin. Surely some blame can be chalked up against the inflammability of this material, but, under normal conditions of handling, pyroxylin is not dangerous. It certainly does not explode, even though the rapidity with which it burns gives a sudden rush of flame which ignorant witnesses might call "an explosion." Storage of the solvents and solutions, however, is another matter, for most of these are dangerous in the extreme.

The strangest part of this recent catastrophe is the fact that Arlington Township, where it occurred, is one of the centers for pyroxylin production and fabrication; that the local officials have passed licensing and inspection regulations, thereby indicating their knowledge of existing hazards; that this plant was not regularly inspected and had escaped other precautionary measures. The townspeople, therefore, can really charge the destruction of their citizens to their elected officials.

And, as usually happens where political incompetence is concerned, the investigation will probably draw a blank. The pyroxylin industry, suffering under this added notoriety, should insist on a thorough, non-political, investigation. An industry's reputation needs jealous watchdogs.

The correct spelling of pyroxylin is pi r squared, but in this case is changed to pi r double-crossed.

When the government spends \$15,000,000 on a new ship for its navy, it purchases materials from 45 states. Curiosity seekers will be interested to know that the only purchase made in New Hampshire is an unspecified amount of "ebony asbestos for switch-board panels."

To most of us, buttons may mean only several empty buttonholes. To Judge Carrigan of New York, however, their significance is doubled. He has sentenced one David Dubin who made a racket out of the button industry by forming the Cloak and Dress Covered Button Manufacturers' Association and employing Caponesque methods of membership. That Association was certainly misnamed! "Undiscovered" is the word we would use.

In a radio address on the night of June 25, our Administrator for the National Recovery Act, Brigadier General Hugh S. Johnson, spoke of the fine cooperation that industry is showing in the attempt to pull America out of the bottomless pit. "What we need," said the Administrator, "is to have every good man on the ropes." The good men, General—and many of the others also—, have been on the ropes continuously for several years. And when we say on we mean, of course, across!

General Johnson also spoke of the effect of "wildcat price lifting on creature necessities." That ol' Devil the Animal Kingdom, again!

Early in June, this country was non-plussed and astounded to read an endorsement by a custom molder of the products of a consumer molder. From coast to coast, strong men wept. Business was at a standstill.

It happened when that enterprising manufacturer, Walter P. Chrysler, concocted an advertisement featuring the endorsement of V. C. Echlin. Mr. Echlin bought a Plymouth Six for his salesmen and, with a friendly gesture, spoke up in confirmation of his judgment through the medium of Mr. Chrysler's national advertising. Mr. Echlin has a molding business in San Francisco, the Universal Molding Company: Plymouth's molded parts, for ignition system and such, are made in Anderson, Indiana by Delco-Remy!

Adding insult to injury, the ad claimed that custom-molder Echlin knew automotive values because he made automobile parts!

After figuring our Income Tax and finding out—we never could count our cigarettes!—that we really do owe the Government, the problem has always been how to pay. We've solved that, however. Next time we send \$1.00 and a note identifying it as a token payment. The Bureau, we know, will have no hesitancy in "characterizing the resultant situation as a default."

A meaty number, this July issue. Ranges from solutions, through coverings, to solids—such as shatter-proof glass. What with every branch of the field breathless from trying to catch General Johnson's bandwagon, stave off competition from the other materials, make a little money out of a nation of unemployed, and spend as little of that as possible, we can see a whole summer of dog-days. To say nothing of the nights! So, as we

started to say, you can curl up with us every month and really "get away from it all." That's why we've given all this meat we spoke about.

A certain proportion of every younger generation out of the past twenty has been able to alibi its way out of every fight by pointing meaningfully at the glasses on its nose. If the transparencies in that field do nothing else, they can eliminate those little boys' excuses. Then we really would enjoy a second childhood!

Vinylite, that material so entertainingly discussed in our June issue, was aided and abetted in its development by the Melon Institute. The urea material, Plaskon, was also developed under the same auspices. These two facts add significance to the article on a new phenolic base which Dr. P. W. Jenkins and Dr. A. M. Coffman have contributed to this number. In directing much of its research along plastic lines, the Institute is performing a genuine service to industry.

Mentioning Vinylite, above, reminds us of a friend who, hearing that the material was extensively used for phonograph records, wondered whether Europe was keeping step with this development. He says in a letter, that Europe certainly is: that the Nippon Victor Chikouki Kaibushiki Kaisha, Japan, is one of the leaders! Could we doubt it?

We have been chided for calling our reference to midget cameras, last month, a tip-off. The chider says that almost everyone knew about it a year ago; the chidee responds that it never appeared in print before. But it grieves us sorely to retaliate, so we generously give more:

What molder has a new patented application for the breweries?

What executive, long prominent in the plastics industry, has been placed in charge of what nationally known concern in Connecticut, and why?

Why is one of our larger molders so interested in home refrigeration—from the commercial angle?

When will the new shock-proof phenolic and the new non-flammable acetate be on sale?

What architectural application will be seen for the first time when the next unit of Radio City opens to the public?

Which electric manufacturer is suing his molding department for divorce?